

UNDERGRADUATE COURSES 1992

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INTRODUCTION

Undergraduate Courses 1992 has been prepared to help registered undergraduates choose their courses for 1992. You should read it before completing your conditional registration form. There are three separate tables which you may wish to refer to in parallel with the individual course descriptions. While every effort is made to ensure accuracy, the material in *Undergraduate Courses 1992* is subject to later alteration in the light of changes in regulations, policy or financial or other constraints. You will be informed before the 1992 academic year of any changes that affect you.

SECTION 1 CHOOSING COURSES

GENERAL ADVICE

There are more than 130 courses in the undergraduate programme, each one interesting in its own way. How will you choose between them? Obviously you will have to abide by the BA degree regulations but, unlike students on many degree courses offered by other institutions, you have to decide which courses will make up your degree. So, how will you choose: individual courses which interest you, or a pattern of courses developing a central theme? Perhaps you want to build on your past experience and knowledge, or to work towards the fulfilment of a goal by developing a particular skill or combination of skills. What might appear to someone else to be unrelated courses may well be — given your circumstances and aims — the logical and right choice for you.

Your reasons for studying are quite likely to change as you progress. It might therefore be useful to look ahead to the time when you obtain your degree and ask yourself what you would like to see as a result of having studied with the Open University.

Things to consider in choosing courses

- Subject coherence** Do you want, or need, to choose courses so that you can, as far as possible, obtain a degree in a single subject? If so you should consult the faculty-recommended related courses which are listed in Table II, and also note the 'complementary courses' mentioned in many of the descriptions of individual courses.

- Recommended prerequisites** It is difficult to take certain courses if you know virtually nothing about the subject, although it can be done. Prerequisites are an indication of what you should already know (i.e. what the course team assumes you know) and are strongly recommended. Clearly if you do not have the prerequisites you are quite likely to fail. And if you have not studied the prerequisites for a particular course or acquired the relevant knowledge or skills elsewhere, you may find that this makes a half-credit course demand as much work and effort as a full-credit one. Drop-out and failure, in particular from third-level courses, are matters of real concern: not just for the student for whom the experience may be painful in itself and a waste of time, but also for the University. We therefore advise that, if you are in doubt about your preparedness to take a particular course, you air those doubts with your tutor-counsellor or make use of 'diagnostic quizzes' and preparatory material as suggested by the course team, so that you can assess your position for yourself. Your tutor-counsellor may also be able to put you in touch with other students who have studied the course, with course tutors or a staff tutor. Consider carefully the academic objectives of individual courses and do not be misled by attractive-sounding titles.

- Requirements of professional bodies; postgraduate training** Each professional body sees itself as maintaining 'the integrity of the profession' and therefore stipulates which subjects must be studied to enter it. In the context of the Open University, and with the limited number of credits you may take, this means that if you wish to gain membership you will have to take certain courses and set aside others which may interest you. Indeed, almost the whole of your degree may be prescribed in this way. It is worth remembering that 'professional membership' is not the same thing as being able to get a job in the profession. If you intend to go on to a postgraduate degree or undertake some other form of professional training, you should consult the appropriate Recognition Information Leaflets, the titles of which are given on page 3.

Practical considerations

At a different level — but still important — there are other things to be taken into account when choosing courses. Some short-term considerations might include:

- What sort of study and assessment methods are used? Is there a home experiment kit? Will you need access to a computer? Is the course included in the home computing policy?
- Will you have to attend a residential school? Are there optional Saturday day-schools? Is travel going to be difficult? (Your Regional Centre will be able to tell you about tutorial arrangements.)
- Do you know of other students who are planning to do the same course? Have you a potential study group?
- Will you need access to large or specialized libraries? This may be especially important for some of the courses which have a substantial project element. (Consult your regional staff tutor if you are in doubt.) Such courses can be of particular value if you intend to go on to postgraduate study.
- What sort of work-load can you reasonably carry? (Remember that two half credits probably make a greater demand, if only in terms of sheer organization, than one full credit.) Remember also that as you progress to higher level courses the work becomes more exacting. If you intend to attempt more than one full credit equivalent in 1992, you are strongly advised to discuss this with your tutor-counsellor.
- What are the fees and the likely cost of set books? Will there be other expenses such as residential school fees or purchasing a home computer as well as the incidental costs of travelling, materials or getting a babysitter while you attend tutorials?
- Are you likely to get any support from your local education authority, or from your employer (in the form of both money and time off for study and examinations)?
- Have you any special needs or a disability? Will the course be suitable for you? Your tutor-counsellor can help you find out, and there is more information on page 2.

Thinking ahead

Questions to do with your more general plans may arise, such as:

- Does your choice fit in with current degree and advanced standing regulations? Should you do a second foundation course, and if so should it follow immediately after your first one, or would it be better to pursue some of the topics you have found particularly interesting in your first foundation course? There are arguments for and against any strategy, and your tutor-counsellor may be able to help you decide which approach is most sensible for you.
- Are you working for the BA degree, or for the BA degree with honours? If you want honours, will the class of degree you get be important to your plans and does this affect the number of credits you can reasonably take given your other commitments? If you are aiming just for the BA degree, should you be taking any third- or fourth-level courses, or would you be satisfied with second-level and foundation courses?
- Will the course you want be available in future years? Are other courses, more suitable for you, planned for presentation later?
- Would it be sensible to plan for a year off? Significant numbers of students take a break on completion of their BA degree before going on to honours, and others find it necessary for various reasons to take a year off before reaching their degree. But remember that it may be difficult to discipline yourself to start to study again after such a break.
- Do you expect changes in your personal circumstances, such as being sent abroad by your employer, pregnancy, transferring

Course code	Page no.	Course code	Page no.	Course code	Page no.
A102	17	E206	31	S343	47
A204	17	E208	31	S344	47
A205	18	E242	31	S354	48
A228	18	E271	31	S365	48
A241	18	E325	31	S442	48
A282	18	E333	32	SD206	48
A293	19	E362	32	SM355	49
A294	19	ED356	32	SMT356	49
A310	19	EH207	32	ST291	49
A314	20	EH232	33		
A315	20	EM236	33	T102	51
A317	21			T201	51
A318	21			T202	52
A319	21	M101	35	T223	52
A324	21	M203	35	T234	52
A331	22	M205	35	T235	53
A341	22	M245	35	T236	53
A353	22	M261	36	T244	53
A361	23	M332	36	T247	54
A403	23	M343	36	T253	54
AA301	23	M345	36	T254	54
AS283	23	M353	36	T255	54
		M355	37	T264	54
		M357	37	T274	54
		M371	37	T281	55
D103	24	M372	37	T292	55
D205	25	M381	38	T301	55
D210	25	MA431	38	T322	56
D211	25	MA290	38	T331	56
D212	26	MDST242	38	T333	56
D213	26	ME234	38	T334	56
D251	26	MS284	39	T353	57
D300	26	MS323	39	T362	57
D307	26	MST204	39	T363	57
D308	27	MST322	40	T393	58
D309	27			T394	58
D310	27			T401	58
D312	27	S102	42	TM282	59
D314	28	S203	43	TM361	59
D345	28	S236	43		
D421	28	S238	43	U205	60
DE325	28	S246	44	U206	60
DE354	29	S247	44	U207	60
DSE202	29	S256	44	U208	61
DT200	29	S271	44		
		S272	45		
		S298	45		
		S324	45	K254	62
		S325	46		
		S326	46		
		S330	46		
		S339	47		
		S342	47		

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to full-time education or undertaking a shorter course of vocational training, perhaps for financial reasons?

You will no doubt think of other questions which are peculiar to your own situation: but if you feel you need more advice before making your choice for 1992, or wish to discuss the possibilities with someone, then the person to ask within the Open University is your tutor-counsellor. Sources of further information and advice are given below.

Linking your studies with your future plans

Students join the Open University for the same wide variety of reasons that make them choose to study a particular course. But a survey of our graduates showed that two thirds of them gave a job-related reason: the expectation of promotion or change of occupation were the most commonly mentioned. By the time these people actually graduated, most (again two thirds) reported that their studies had had a beneficial effect upon their career. The value of a degree for most jobs is that it is a shorthand way of indicating that you have acquired skills, knowledge and personal qualities which are seen as important by employers. The content of your degree will also clearly be important, but attitudes to this vary from employer to employer, and from one type of work to another. If this is of concern to you, it might be useful to speak to people (or to their employers) who are doing the sort of work that interests you in order to get their advice about courses which may be appropriate.

You will be aware that the Open University does not offer a degree in any single subject. Which courses you study is for you to decide: you have to select the particular combination of, say, chemistry with mathematics, physics and perhaps poetry as well, that will meet your needs. Certainly, there are many examples of useful 'blending of dissimilar skills': the numerate arts graduate; the artistically talented social worker; the engineer with a sound business sense.

For a further discussion about linking your studies with your career, see the booklets *Career Choices and Degree Planning* or *What OU graduates have done*, copies of which are available on request from your Regional Centre.

How to choose

You can make a choice intuitively or rationally, but you will probably want to set out quite explicitly what criteria you will use in selecting your courses, and why those particular criteria are the important ones. Choosing courses certainly provides an occasion to re-assess your values and priorities: it is an opportunity to influence, if only to a small extent, the direction your life will take. There are probably several reasons why you choose a particular course: either because it is the next logical course to take, or just because it would be interesting to study. But whatever the mixture of reasons, it is unique to you, and known only by you. It could be useful to talk over your reasons with someone else so that what you intend to get from studying does not remain just a private set of hopes.

Your tutor-counsellor can discuss with you such longer-term educational goals, or your career plans, but only from his or her experience and knowledge. Quite probably in your own field you already know more than anyone else does about the intricacies, say, of promotion within your own organization. But you might need information and advice about other matters, such as how to get on to an over-subscribed course of professional training, entry to a particular postgraduate course, moving between organizations, between types of industry, or moving geographically. No-one knows everything there is to know about all these matters, but you could talk about your plans — even if tentative — with your tutor-counsellor, not simply to get advice but because the process of talking is important in itself. It encourages the vague plan to become a possible reality: something which could actually happen, if you still want it to, when the time comes.

Courses available at other institutions under collaborative schemes

Schemes of academic collaboration provide opportunities for Open University undergraduates to receive credit towards the BA degree for study at other institutions. Undergraduates who have obtained certain specified course credits may be able to transfer to another institution for a period of study to follow an approved programme of undergraduate-level courses in a subject area not offered by the Open University. Successful completion of collaborative scheme study can lead to an award of advanced standing credits towards the BA degree, at the rate of 2.0 credits for a full-time academic year of study. The credits are titled and graded, and can count towards honours degree classification.

Collaborative schemes are currently available at fourteen higher education institutions in the United Kingdom. In most, the period of study is the conventional academic year (October to July), but some schemes follow an academic year similar to that of the Open University (January to December). Some schemes provide for full-time study at the other institution, some for part-time study. For schemes following the conventional academic year, part-time study will usually require attendance during the normal working day; schemes following the calendar year require attendance in the evenings, and usually also at weekend classes and summer schools.

An information sheet available from the Central Enquiry Service, The Open University, PO Box 71, Milton Keynes MK7 6AG gives a list of the current schemes and indicates for each scheme the faculty or Regional Centre from which further details can be obtained.

Applications for admission to collaborative schemes are made initially through the faculty or region, and arrangements vary from scheme to scheme. For some schemes, applications for entry in October can be made as late as May of the same year; for most the closing date is much earlier. For all schemes, a proposed programme of study must be constructed and submitted to the

Advanced Standing Office for approval at least three months before the period of study would begin.

The numbers of places available on these schemes are limited and decisions about admission are taken by the other institution, not by the Open University. If you apply for one of the schemes, you are strongly advised to register conditionally for the Open University course which you wish to take should you not obtain a place on the collaborative scheme.

TRANSFER TO OTHER INSTITUTIONS

The Open University degree, even the honours degree, is essentially interdisciplinary. This has its own strengths which are recognized by many employers: very substantial numbers of Open University graduates have also gone on to do higher degrees or professional diplomas. But if, for your own reasons, you want a traditional 'single subject' degree, or need to graduate more quickly, or would prefer a less 'distant' experience of study, then it might be wise to consider transferring to a full-time course. This is often possible after as few as one or two Open University credits have been completed. For example, if you think your age may be against you, transferring to a course which has a more immediate vocational relevance could make sense for your career, without removing the possibility of completing your Open University degree at a later date.

More information about transfer to other courses and educational institutions is included in the University's *Undergraduate and Degree-level Associate Student Handbook* and the appropriate Recognition Information Leaflet. If you are in doubt, approach the relevant education institutions directly yourself, since all applications are decided on the merits of the individual case. Your tutor-counsellor or Regional Centre may also be able to offer help or advice.

FURTHER INFORMATION AND ADVICE

Regulations

Consult your 1990 *Student Handbook* and its *Supplement* for restrictions on course choice, allocation to and availability of courses, and fees (see also the next section, particularly for the change in policy about second foundation courses).

Courses

Read the appropriate course guides, look at course units and assessment materials and consult samples of the recommended reading for the course. It may be useful to talk to students who have taken the course and to read the edition of *Sesame* issued at about the time of conditional registration.

Study skills

The Good Study Guide, by OU tutor Andrew Northedge, enables you to acquire and improve essential study skills. It helps you to organize yourself and to read with concentration and understanding, take pertinent notes, write fluent and forceful essays and prepare effectively for exams. All kinds of study, on your own and in groups, are discussed. Through the practical exercises, real examples and good advice you can develop for yourself effective approaches to suit your learning style and your circumstances. Although it is a set book for the social sciences foundation course, *The Good Study Guide* is a valuable introductory workbook for all new students and an informative reference book for continuing students. It is a paperback, price £5.95, published by the Open University and available from all OU set book stockists and other good bookshops.

Career planning

Career Choices and Degree Planning offers help with career decisions and choosing courses. It explains the various kinds of help available to you locally and gives information about the Open University's vocational guidance service. The reference section includes a comprehensive guide to further reading (about grants, postgraduate study, career choices etc.). Copies of this booklet are available from your Regional Centre.

Careers Information for Students with Disabilities has been specially written for Open University students with disabilities. It gives information about sources of advice and help with making decisions about the future. It is available on tape for visually handicapped students, and you can obtain large-print and comb-bound copies of the booklet from your Regional Centre.

Occupational information

The leaflet *Career Planning* is a brief guide to the written material available to help you in your choice of occupation. It is included in the conditional registration mailing.

The Open University, through its membership of the Association of Graduate Careers Advisory Services, can provide you with the Association's graduate careers information booklets. The booklets are written with the needs of new graduates in their early twenties in mind but they nevertheless contain useful information about a wide range of careers. The Open University has produced a booklet *Prospects for Mature Students* which is designed to be read alongside the AGCAS booklets and to alert you to considerations which affect mature students in particular. Individual supplements to some of the AGCAS booklets have also been produced. They are listed in *Career Planning* and can be obtained from your Regional Centre.

Sources of advice

In the first instance you should raise any questions about your choice of courses with your tutor-counsellor. In addition, many 'conditional registration and course choice evenings' are held at study centres in June. These sessions give you an opportunity to look at the course materials and talk to other students, as well as to members of the tutorial and counselling or full-time staff. Also, if necessary, feel free to ask your tutor-counsellor to meet you at some other mutually convenient time to discuss your own situation.

Potential study difficulties for students with disabilities

While the Open University can be the most suitable means of study for people with some disabilities, all Open University courses have a large amount of visual material which you must read in order to complete your studies successfully; some also have audio materials. If you have a visual or aural handicap the University makes special provision, described below, to help overcome this. In the 'Notes' section of each course description under 'Students with Disabilities', we have indicated where the course team foresees particular problems in addition to those normally experienced by students with impaired sight or hearing. You should read the individual course descriptions for brief details, but for more specialist advice write to the Adviser on the Education of Students with Disabilities, Regional Academic Services, The Open University, Milton Keynes, MK7 6AA. If students with disabilities are not mentioned in the 'Notes' no particular difficulty is expected.

Course units and set books on audio cassette

We try to make most of our course material available on audio cassette, but because of the production schedules for new courses and inevitable delays in recording, course materials, except for foundation courses, are not available on audio cassette in a course's first year. If you are unable to study from conventional written materials, you are advised not to take a course other than a foundation course in its first year of presentation.

Course and supplementary materials are available on tape from the Office for Students with Disabilities for all except the following courses in 1992: A314, A315, A403, AA301, AS283, D212, D213, D300, D345, D437, D440, E242, E325, ED356, EM236, M203, M343, M345, M371, M372, M431, MA290, ME234, MS284, MS323, MST322, S256, S298, S325, S330, S339, S342, S343, S344, S365, S442, SD206, SM355, SMT356, T201, T223, T235, T236, T253, T254, T255, T264, T292, T301, T322, T331, T333, T334, T353, T362, T363, T393, T394, T401, U207, U208. This is indicated by a footnote in Table I and in the individual course descriptions. If you have any questions about the availability of course material on tape, please ask the Office for Students with Disabilities, The Open University, PO Box 79, Milton Keynes MK7 6AA.

If you rely on tapes and wish to include any of the courses currently not available on tape in your degree profile in 1993 or later, please ask the Office for Students with Disabilities for information. Recording priorities are determined by demand, so it is helpful if you let us know early about your interest in particular courses. As a general rule, requests for the recording of courses not currently on tape need to be made at least twelve months before the course begins.

Most set books and course readers in cassette form are available from the Royal National Institute for the Blind Cassette Library, Customer Services, PO Box 173, Peterborough PE2 0WS (telephone 0733 370777). If you do not qualify for RNIB services, the Office for Students with Disabilities may be able to help you; please ask. You are advised to place requests for set books and course readers as early as possible so that they can be copied and sent to you before your course begins.

An audio cassette containing extracts from *Undergraduate Courses 1992* has been sent to students who usually receive their course material on tape and is available on request from the Office for Students with Disabilities.

Transcripts

Transcripts of most radio and television programmes and most audio and video cassettes are available for all courses except those in their first year of presentation. If you have any questions about transcripts please ask the Office for Students with Disabilities.

Residential schools

Special facilities can be provided at residential schools. If necessary, you can be accompanied by your own personal helper or you may be considered for excusal from the school on grounds of disability. If you have mobility problems and would like information about particular residential school sites you can obtain leaflets from the Administrative Assistant, Residential Schools Section, The Open University, Milton Keynes, MK7 6AA.

Regional advice

Tutorial arrangements vary from course to course, and you may need to know more about where study centres are and what facilities they have. Staff at your Regional Centre will be able to advise you. You should raise any questions about your choice of courses with your tutor-counsellor, who can obtain fuller information for you if necessary.

Recognition Information Leaflets

These leaflets give information about academic, vocational and professional areas where Open University degrees and course

credits are recognized as qualifications equivalent to those offered by other educational institutions of the United Kingdom.

Regional Centres have supplies of the leaflets and your tutor-counsellor has a complete set for reference. They can also be obtained from the Central Enquiry Service, The Open University, PO Box 71, Milton Keynes MK7 6AG. They are designed to help you in choosing courses rather than in choosing a career. The leaflets will be revised as further information becomes available, and additional leaflets may be prepared. You are invited to inform the Assistant Registrar (Advanced Standing and External Recognition), at Walton Hall, of any successes or problems you have met in seeking recognition for your studies from employers and external bodies.

The leaflets are grouped as follows:

Group 1 Recognition of Open University qualifications: particular careers

- 1.1 Teaching: training and salaries (England, Wales and Northern Ireland)
- 1.2 Teaching: training and salaries (Scotland)
- 1.3 Social work (including probation and community work), nursing and midwifery.
- 1.4 Civil Service, Armed Forces, Merchant Navy, Police and public corporations

Group 2 Recognition of Open University qualifications: transfer to higher education elsewhere

- 2.1 Entry to undergraduate and postgraduate courses: general
- 2.2 Credit transfer and collaboration at undergraduate level
- 2.3 Entry to medical and veterinary science schools
- 2.4 Transfer to higher education and employment overseas
- 2.5 Credit transfer at postgraduate level

Group 3 Recognition of Open University qualifications: membership of professional bodies

- 3.1 British Psychological Society
- 3.2 Royal Town Planning Institute
- 3.3 Professional engineering institutions
- 3.4 Institution of Water and Environmental Management
- 3.5 Not issued this year: the Institute of Measurement and Control is now included in leaflet 3.3
- 3.6 Institute of Mathematics and its Applications
- 3.7 College of Radiographers
- 3.8 Scientific institutions (including Institute of Biology, Royal Society of Chemistry, Geological Society, Institute of Physics, Institute of Food Science and Technology)
- 3.9 Accountancy and financial institutions (including accountancy bodies, Institute of Actuaries, Institute of Internal Auditors, banking institutions)
- 3.10 Administration and management institutions (including Institute of Chartered Secretaries and Administrators, Institute of Health Service Management, Institute of Personnel Management, Institute of Administrative Management, Institute of Management Services, the Chartered Institute of Marketing)
- 3.11 Other bodies (including British Computer Society, Institution of Analysts and Programmers, European Institute of Production Management, Institute of Statisticians, Royal Institution of Chartered Surveyors and the legal profession)

Group 4 Recognition of Open University qualifications: grants and other sources of support

- 4.1 Employer support
- 4.2 Grants and other sources of support for study (including postgraduate study)

There is also a leaflet *A Guide for Employers — How to Make Use of the Open University*.

SECTION 2: RESTRICTIONS ON COURSE CHOICE

Before choosing your courses for next year and completing a conditional registration form you are strongly advised to read the sections on registration and progress (sections 4 and 6) in your 1990 *Student Handbook and Supplement*. Although there are relatively few restrictions on which courses you can take, the following points are worth emphasizing.

Allocation to courses

The vast majority (98%) of students are allocated to their first choice conditional registration course(s). However, the University cannot guarantee allocation to a particular course preference — unless that preference is for a foundation course. If more students wish to take a post-foundation level course than there are places available, the University is obliged to put a quota on the course. This limit set on the number of offers made, after taking into account predictions of how many students are likely to decline an offer or fail to register. Students are considered for offers according to (i) their year of final registration in the BA degree programme and (ii) their personal identifier number. This means that your chance of being offered a place on an over-subscribed course will depend on how long you have been an undergraduate student. For example, students who completed final registration with the University in 1984 will have priority over those who did so in 1986. If you are competing for a place with someone who entered the undergraduate programme in the same year as yourself, the person with the lower personal identifier number will be given preference. If you are currently studying a course which is known to be over-subscribed and have chosen to repeat it in 1992 if you fail or withdraw, you are very unlikely to get a place in 1992. In this situation, the University takes the view that first-time applicants should get preference over those who wish to repeat the course. A few courses have allocation procedures which differ from these; they are explained in the course descriptions.

Availability of courses

The University reserves the right to withdraw, postpone or change a previously publicized course. As much notice as possible will be given to registered students if such changes have to be made.

If you took a course in its last year of presentation in 1991 and are permitted to resit the examination, you will have the opportunity to resit the examination in 1992 even though the course itself is no longer available.

Foundation course requirements

In accordance with a change in regulations in 1990, you are no longer required to complete two foundation courses for the award of a BA degree. You will need to complete one foundation course, but can choose whether or not to study a second. You will still need six credits for a BA degree and a foundation course must be one of those credits.

If you have an award of advanced standing, your foundation course requirement will remain unchanged unless your award is 0.5 general credit exemptions or 0.5 directly transferred credits, in which case you can choose whether to include one foundation course or two in your degree.

It is now up to you to decide whether or not to take a second foundation course, and there are many things to consider in making your decision. If you intend to specialize, for personal or career reasons, and might have difficulty fitting all the courses you want into your degree, you may be wise to concentrate on higher-level courses. But the educational arguments for taking a second foundation course remain. Indeed, you may need two foundation courses to give you the necessary breadth of study from which to select the courses you want to study at a higher level. Two foundation courses are also valuable if you do not have an extensive educational background, because they can prepare you more thoroughly for future study and reinforce the distance-learning methods which the University uses. A second foundation course will introduce a variety of subjects which you might have overlooked and may encourage you to develop a different degree profile than you had in mind when you first registered as a student. Foundation courses offer much more local tutorial support than you can expect from second- and third-level courses. Support from fellow students is also greater on foundation courses: there may not be anyone in your area studying the same higher-level course as you. Summer schools are a part of all foundation courses but not of many higher-level courses. You will need to consider all these things carefully as you decide whether or not to study a second foundation course.

In the 'overview' section at the beginning of each faculty's course descriptions more specific advice is given about foundation course requirements for courses in the faculty. It is important that you read this advice carefully. Recommended prerequisites for courses are not affected by the changes in the foundation course requirements and, for some courses, it is still necessary to have studied two foundation courses.

If, after reading the advice in this section about how to build up a degree profile, the advice in the faculty overview and the recommended prerequisites for a particular course, you are still in any doubt about whether you ought or need to take a second foundation course you should consult your tutor-counsellor, who will be able to discuss your study plans and direct you to the best advice. But the decision whether or not to study a second foundation course now rests with you.

Honours degree requirements

To qualify for the BA (Honours) degree, at least two of your course credits must be at third or fourth level.

You must complete your credit requirements at third or fourth level within the maximum permitted number of credits (including any advanced standing award): ten for students who finally registered between 1971 and 1976 inclusive, and eight for students who finally registered in 1977 or later. If you do not complete at least two third- or fourth-level full course credits (or equivalent) within the maximum number of credits, you will not be eligible for the award of the BA (Honours) degree.

'Discretionary' credit exemptions

Some students who finally registered with the University before 1981 and claimed advanced standing before 1987 on the basis of initial teacher training received advanced standing awards which included a 'discretionary' credit exemption, to be awarded only on completion of an approved programme of Open University courses. (Of the current courses, any course with 'E' in the code or MDST242 can be chosen as part of an approved programme of study.)

If you have received such an award and wish to benefit from the discretionary exemption, you should check the conditions of your award carefully. If you have followed an approved programme for the BA degree but do not follow an approved programme for the BA (Honours) degree, you will not be able to count the discretionary exemption towards the honours degree. If you need a copy of the conditions of your award, please write to the Advanced Standing Office.

Number and level of courses

You may not register for any course at post-foundation level unless you have obtained at least one course credit at foundation level. MS284 *An introduction to calculus* and TM282 *Modelling with mathematics: an introduction* do not count as foundation courses for this purpose. Although you may register for a course at any level once you have passed a foundation course, we advise that you should not attempt a course at third or fourth level unless you have passed at least one course at second or third level respectively. You are strongly urged to discuss your study plans very carefully with your tutor-counsellor if you are thinking of ignoring this advice.

You may register for a maximum of two full-credit courses (or full/half-credit combinations) and a minimum of one half credit in any one academic year. (Resit examinations count towards the number of courses for which you can register in any one year.) You may not register in the same year for courses from both the undergraduate and the associate programmes of study which together exceed 68 units of work or the equivalent of two full-credit courses. You are not allowed to take courses that would take you over a total of ten full credits if you are an undergraduate who finally registered in 1971–76, or eight full credits if you are an undergraduate who finally registered in 1977 or later.

Combinations of courses

Certain courses have a substantial overlap of academic content and you may not count more than one of them for credit purposes: these courses are called *excluded combinations* and are indicated in the course descriptions and in Tables I and III (see also 'Remakes' below).

If you have an advanced standing award of directly transferred credits you will not be allowed to count for credit any course which substantially overlaps with the previous studies on which the award was based.

Regulations governing excluded combinations also apply to course credits transferred from the associate programme to the undergraduate programme, and to courses taken for a previous BA degree of the University.

Remakes

After a number of years some courses are remade. Because the 'remade' course will normally have a significant amount of common material with the original version, the two courses will usually be designated as an excluded combination and the restriction described above will apply. There are a few exceptions which are explained in the relevant course description. The Table of Discontinued Courses (Table III) lists all past courses and the courses (both discontinued and current) with which they form excluded combinations.

Repetition of courses

You may not register for a course which you have already passed, and may not count a particular course credit towards more than one degree.

Second BA degree

You will not be accepted for admission to a second BA degree of the University until you have completed the requirements of the BA degree for which you first registered.

Fees and other costs

You will be told the 1992 fees as soon as they are decided (probably in November/December). You may have some expenses in addition to tuition and residential school fees. As well as television and radio, some courses require access to audio cassette, video cassette or record players, or to a home computer, as mentioned in the course descriptions. Set books for some full-credit courses can cost over £60. Prices are not usually given in course descriptions, but the number listed may give a

rough indication of costs. Prices will be given in the *Set Book List* sent to you in November or December.

Academic progress

Your right as a finally registered student to register for courses in subsequent years of your choice, until you have completed the maximum number of credits permitted for the award of a BA (Honours) degree, depends on your making satisfactory academic progress. 'Satisfactory academic progress' is defined as passing at least one foundation course or either MS284 or TM282 after four years of study in the undergraduate programme. If you do not achieve this level of progress the University will cancel your registration for the BA degree. As long as you satisfy this minimum requirement, your registration will not be affected by your subsequent academic progress, except that the University may limit the numbers of credits you can take if you fail to pass a course after three years of study. Your right of future registration is also subject to your not being in debt to the University. See the sections on registration and fees in your 1990 *Student Handbook*.

Continuing your studies overseas

If you take up permanent or temporary residence abroad and wish to continue with your studies, you should not underestimate the problems that may arise. You will receive no tuition in person; you may have no access to television and radio programmes; you may not be able to take a home kit overseas; you may have problems with your home computer. Nevertheless, many students do continue their studies abroad successfully. If you wish to continue your studies from an overseas address, read carefully the course descriptions and also the information given in Section 3 of this publication and in the 1990 *Student Handbook*, and write for more information to The Undergraduate Student Office, PO Box 72, Walton Hall, Milton Keynes MK7 6AQ.

SECTION 3: 1992 UNDERGRADUATE COURSES

Included in this section are details of all the undergraduate courses available in 1992 as listed in Table I. To help you make your choice each faculty and the 'U' area has provided a general overview of its courses.

Please refer to the previous section for advice on choosing courses and for a summary of the regulations which may affect your choice.

Explanatory notes

You are advised to read these notes before turning to individual course descriptions.

Course codes A list of the codes of current courses and their titles is given in Table I. The following information about courses can be derived from the course codes:

Faculty The letter(s) which prefix the course code represent the faculty or faculties responsible for the production of a particular course.

- A = Arts Faculty
- D = Social Sciences Faculty
- E = School of Education
- H = Institute of Educational Technology
- K = Department of Health and Social Welfare
- M = Mathematics Faculty
- S = Science Faculty
- T = Technology Faculty
- U = U Area (University-wide)

They are not intended as a guide to the suitability of including a course in a particular degree programme, nor should they be taken as a definitive indication of the course content. Many courses, although produced by one faculty, are of an interdisciplinary nature and can be of interest to a wide variety of students. You are strongly advised to read the detailed course descriptions rather than make assumptions about their content on the basis of the course code and title alone.

Course levels The first figure in the course code indicates the course level. Course codes for foundation courses begin with 1, e.g. D103, S102. Second-level courses begin with 2, e.g. T234, third-level with 3, e.g., D300, and fourth-level with 4, e.g. A403.

We have tried to design second-level courses for the student in search of breadth, and have given as wide a choice of subject matter as possible. Often third-level courses will be more specialized, or they may depend on skills you have acquired in earlier studies with the University. At this level, as at the fourth level, your work will be assessed at honours degree standard and you may accordingly expect courses to be more exacting than the work at previous levels.

Credit rating The credit rating of a course is shown by the middle figure of the code. Full-credit courses have an '0' or '1' in the middle; any other figure usually indicates a half-credit course, e.g. D309 and A314 are full-credit courses; SM355 and M371 are half-credit courses.

Course presentation All courses have a limited period of presentation, at the end of which they are either withdrawn altogether or remade. The planned period of presentation is given in Table I if it is known, but the University reserves the right to defer or change the last year of presentation. A change in the University's policy means that some courses are now listed as having an indefinite life. These will be kept up to date by the course teams throughout their presentation.

Notes for prospective students Under this heading are given the more practical details of each course, such as the recommended prerequisites, broadcasts, residential school, set books, etc. If any such details are not given you can assume that they do not apply to that course. If you have a disability you should also read the notes in Section 1.

Excluded combinations (See Section 2) These are indicated in the course descriptions and in Tables I and III. Courses which are now discontinued are shown in square brackets in the 'Notes for prospective students'.

Recommended prerequisites Before registering for certain post-foundation level courses, you are advised that you should already have obtained a credit for another particular course (or courses). These 'recommended prerequisites' are indicated in Table I and in the detailed description of each course. Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and dates of presentation are listed in Table III. Unless otherwise stated, you can assume that the predecessor/s of a current course will serve as an alternative prerequisite. More information about recommended prerequisites is given in the faculty overviews.

Tuition The amount of face-to-face tuition is more limited on higher-level courses and varies according to the nature of the course. Because of regional variations little information about individual courses can be given here; ask your Regional Centre for more details.

Assessment Before you begin your studies you will receive a Broadcast and Assignment Calendar telling you when your broadcasts are, the dates by which your tutor-marked assignments (TMAs) and computer-marked assignments (CMAs) are to be submitted (cut-off dates), and how many are necessary for assessment purposes.

We realize that you will not always be able to complete all the assignments: you may, for good reasons, get behind with your work; or you may find some parts of the course more difficult or less interesting. We do not wish to penalize you in such cases and so we have adopted assessment strategies which allow some flexibility in the submission of assignments. Full details of assessment strategies and of substitution are given in the Assignments and Examinations section of the 1990 *Student Handbook*.

Broadcasts and cassettes The course descriptions and Table I give brief details of television and radio programmes and video and audio cassettes. Fuller details are given in the Broadcast and Assignment Calendar for your course(s). For courses which have audio and video cassettes you will need the use of cassette players. The importance of the cassette player, either video or audio, in the course work is indicated in the notes. For some courses, a cassette player is necessary because video or audio material is designed to interact with course units. For others, while a cassette player is desirable, it will not be detrimental to your studies if you do not have access to one. If you have difficulty in gaining access to video replay machines you should seek advice from your Regional Centre. Some videos have to be returned at the end of your studies: this will be mentioned in the course description. More information will appear in the *Conditional Registration Supplement* sent to you in August.

Home kit Courses which have a home kit are indicated in Table I and in course descriptions. The kits for some courses may not be taken or sent outside the United Kingdom; if this is known at the time of going to press it is indicated in the course description. More information will appear in the *Conditional Registration Supplement* sent to you in August.

Residential school For some courses you must attend a summer school or weekend school in order to complete the course for credit. This is indicated in the course description and in Table I. The residential schools fall into two categories:

Course-based One residential school is part of the course.

Discipline-based One residential school serves, and satisfies the requirements of, more than one course in the same discipline.

Full details of all residential school requirements are given in the relevant section of the 1990 *Student Handbook*.

Computing Some courses include computing, although in some cases this is optional. These courses fall into the following categories:

Courses in the home computing policy

Courses for which the University provides a home kit

Courses for which computing facilities are provided at residential schools

Other courses for which students must arrange access to particular equipment.

The course descriptions explain which category courses fall into. Included in this mailing is *Information about home computing for 1992*, which sets out the home computing policy specification and gives more information.

If you will be resident overseas in 1992, some of the courses with a home computing element may present you with additional problems. Although there are no technical difficulties with on-line access, it may be expensive and outside Western Europe there may be restrictions on the University's licence for some of the proprietary course software. You must both check local regulations about import of particular machines to your country of residence and make sure that you can obtain compatible power supplies, maintenance and consumables. (See also Section 2.)

Students with disabilities See Section 1 'Potential study difficulties for students with disabilities'.

Set books The *Set Book List* is sent to you in November or December. As you will need the books throughout the course you are advised to buy them rather than borrow them from public libraries. Do not delay your purchase or you may have to start your course without the set books.

Preparatory reading Some course teams have suggested work which you might like to do before you start studying the course. If you ought to purchase preparatory reading material, this has been indicated in the notes. Otherwise, you can assume that you can borrow the books just for your work before the course begins.

TABLE OF 1992 UNDERGRADUATE COURSES

TABLE I

Table I lists all the courses planned for the undergraduate programme in 1992. Full details of these courses are given in Section 3 of *Undergraduate Courses 1992*; you should read these before making your choice. Please also read the footnotes to this table. The titles of courses that are planned for first presentation in 1992 appear in bold type; the planned presentation dates of courses that may no longer be available after 1992 and 1993 are underlined. The codes of discontinued courses appear in square brackets (please see Table III for a list of discontinued courses and their replacements). Unless otherwise stated, you can assume that the predecessor(s) of a current course will serve as an alternative prerequisite to the course in question (but see footnote to part-credit science courses in Table III).

Entries marked with an asterisk are explained in the Notes column. In the Residential school column, CB means course-based, DB discipline-based.

Course code	Course title	Credit rating	Excluded combination	Recommended prerequisite	Total number of TMA's	Project work	Broadcasts TV	Radio	Cassettes Audio	Video	Home kit	Residential school	Computing	Notes	Planned presentation dates (inclusive)	Course code
A102 ⁴	An arts foundation course	Full	[A100] [A101]	—	8	—	32	16	Yes	—	—	CB	—		1987-1996	A102
A204	The Enlightenment	Full	—	—	8	—	16	33	—	—	—	—	—	Long-playing records provided. Day schools.	1980-1992	A204
A205	Culture and belief in Europe 1450-1600	Full	—	A102	8	—	24	16	Yes	—	—	—	—		1990-1999	A205
A228	The religious quest	Half	[AD208]	—	4	—	6	—	Yes	—	—	—	—		1986-1992	A228
A241	Elements of music	Half	—	—	8	—	8	—	Yes	—	Yes*	—	—	*Electronic organ provided (optional). Long-playing records provided; recorder required.	1977-1993	A241
A282	Science, technology and everyday life 1870-1950	Half	—	—	4	—	8	—	Yes	—	—	—	—		1989-1998	A282
A293	Rome: the Augustan age	Half	[A291]	—	4	—	8	—	Yes	—	—	—	—		1982-1992	A293
A294	Fifth-century Athens: democracy and city state	Half	[A292]	A102	4	—	8	—	Yes	—	—	—	—		1989-1998	A294
A310 ¹	Life and death	Full	—	A102	8	—	—	—	Yes	—	—	CB	—		1988-1997	A310
A314 ^{1,5}	From Baroque to Romantic: studies in tonal music	Full	—	A241	8	—	—	—	Yes	—	—	CB	—	Long-playing records provided.	1984-1996	A314
A315 ^{1,5}	Modern art and Modernism: Manet to Pollock	Full	—	—	8	—	32	32	—	—	—	CB	—	Extended essay (TMA 08).	1983-1992	A315
A317 ¹	Themes in British and American history: a comparative approach c1760-1970	Full	—	A102 and [A203] A204 or A205	8	—	8	—	Yes	—	—	—	—		1985-1994	A317
A318 ¹	War, peace and social change: Europe 1900-1955	Full	[A301] [A309]	See course description	8	—	—	—	Yes	Yes	—	CB	—	Extended TMA 06/07.	1990-1999	A318
A319 ¹	Literature in the modern world	Full	—	A102 A204 A205	8	—	16	16	Yes	—	—	CB	—		1991-2000	A319
A324 ¹	Liberation and reconstruction: politics, culture and society in France and Italy 1943-1954	Half	—	[A203] A204 A293/A294	5	—	—	—	Yes	Yes	—	—	—		1990-1999	A324
A331 ¹	Religion in Victorian Britain	Half	—	See course description	4	—	—	—	Yes	—	—	—	—		1989-1998	A331
A341 ¹	Beethoven	Half	—	A241	4	—	—	—	Yes	—	—	—	—		1988-1998	A341
A353 ¹	Art in fifteenth-century Italy	Half	—	—	4	—	12	—	Yes	—	—	—	—	Visits to local art galleries recommended.	1986-1996	A353
A361 ¹	Shakespeare	Half	—	A102 and [A203] or A204	4	—	12	8	Yes	—	—	—	—		1984-1995	A361
A403 ^{1,4,5}	Arts and society in Britain since the thirties	Full	—	See course description	5	—	Yes	—	—	—	—	—	—	Independent research undertaken for project.	1983-1992	A403
AA301 ^{1,5}	Philosophy of the arts	Full	—	A102	8	—	—	—	Yes	—	—	CB	—		1992-2001	AA301
AS283 ⁵	The rise of scientific Europe 1500-1800	Half	[AMST283]	—	4	—	8	—	Yes	—	—	—	—		1992-2001	AS283
D103 ⁴	Society and social science: a foundation course	Full	[D100] [D101] [D102]—	—	8	—	16	16	Yes	—	—	CB	—		1991-1998	D103
D205	Changing Britain, changing world: geographical perspectives	Full	—	—	7	—	14	—	—	—	—	—	—		1985-1994	D205
D210	Introduction to economics	Full	[D222] [D282] [D284]—	—	7	—	—	—	Yes	Yes	—	—	—		1985-1994	D210
D211	Social problems and social welfare	Full	—	[D102] D103	7	—	16	—	Yes	—	—	—	—		1988-1997	D211
D212 ⁵	Running the country	Full	[D203] [D208]	A102 [D102] D103	8	—	10	6	Yes	—	—	—	—		1992-2001	D212
D213 ⁵	Understanding modern societies	Full	[D207] [D283]	A102 [D102] D103	7	—	8	8	Yes	—	—	—	—		1992-1999	D213

Course code	Course title	Credit rating	Excluded combination	Recommended prerequisite	Total number of TMA's	Project work	Broadcasts TV	Radio	Cassettes Audio	Video	Home kit	Residential school	Computing	Notes	Planned presentation dates (Inclusive)	Course code
D251	Issues in deafness	Half	—	—	4	—	—	—	—	Yes	—	—	—	—	1991-1994	D251
D300	Professional judgment and decision making	Full	D321	—	8	1*	11	—	Yes	—	—	—	—	*Part of TMA's.	1992-1995	D300
D307	Social psychology: development, experience and behaviour in a social world	Full	[D305]	[D102] D103 and DSE202 [DS262]	7*	—	Yes	—	Yes	Yes	—	—	See course description	*One TMA will be a double-weighted project.	1985-1994	D307
D308	Democratic government and politics	Full	—	[D208] and/or [D209]	7	7	8	—	Yes	—	—	—	—	—	1987-1994	D308
D309	Cognitive psychology	Full	[D303]	DSE202 [DS262]	8	—	Yes	—	—	—	—	CB	*	*Computing at day schools and residential school.	1986-1995	D309
D310	Crime, justice and society	Full	See course description	See course description	6*	—	—	—	Yes	—	—	—	—	*Research outline in double-weighted compulsory non-substitutable TMA 06.	1988-1995	D310
D312	Global politics	Full	—	See course description	6*	—	Yes	—	Yes	—	—	CB	—	*One TMA is a double-weighted project.	1989-1996	D312
D314	Restructuring Britain	Full	—	See course description	7	—	—	—	Yes	—	—	—	—	—	1989-1996	D314
D345 ⁵	Economics and government policy	Half	[D323]	D210	4	—	—	—	Yes	—	—	—	—	—	1988-1995	D345
D437 ^{4,5}	Conflict and change in the countryside	Half	—	See course description	6	—	—	—	—	—	—	—	—	No printed unit texts.	1989-1992	D437
D440 ^{4,5}	Perspectives on revolution	Half	—	See course description	6	—	—	—	—	—	—	—	—	No printed unit texts.	1992-1993	D440
DE325	Work and society	Half	[DE351]	See course description	4	—	1	—	Yes	—	—	—	—	—	1985-1992	DE325
DE354	Beliefs and ideologies	Half	—	[D207] or any second-level D course	4	—	—	—	Yes	—	—	—	—	—	1986-1993*	DE354
DSE202	Introduction to psychology	Full	[DS261] [DS262]	[D102] D103	8	—	Yes	8	—	Yes	—	CB	—	Calculator/timer required.	1990-1999	DSE202
DT200	An introduction to information technology: social and technological issues	Full	—	[D102] D103 or T102	7	—	Yes	16	8	Yes	—	Yes*	Home	*Modem supplied.	1988-1993	DT200
E206 ²	Personality, development and learning	Full	[E201] [E281]	—	7	—	Yes	12	—	Yes	—	—	—	—	1985-1993	E206
E208 ²	Exploring educational issues	Full	[E200] [E220] EP228 ⁹	Any foundation course	7	—	—	15	7	Yes	—	—	—	—	1989-1994	E208
E242 ^{2,5}	Learning for all	Half	[E241]	—	5	—	—	8	—	Yes	—	—	—	—	1992-1999	E242
E271 ²	Curriculum and learning	Half	[E203] [E204] [E283]	—	3	—	—	8	—	Yes	—	—	—	—	1991-1998	E271
E325 ^{2,5}	Managing schools	Half	[E321] [E323]	—	4	—	—	8	2	Yes	—	—	—	—	1986-1992	E325
E333 ²	Policy making in education	Half	[E222]	—	4	—	Yes	4	2	Yes	—	—	—	—	1986-1992	E333
E362 ²	Cognitive development: language and thinking from birth to adolescence	Half	—	[D102] D103 or DSE202 [DS262] or E206	4	—	Yes	7	—	Yes	—	—	—	Access to at least 2 children essential for project.	1986-1993	E362
ED356 ^{2,5}	'Race', education and society	Half	[E354]	—	5	—	—	8	—	Yes	—	—	—	—	1992-1999	ED356
EH207 ²	Communication and education	Full	—	—	8	—	—	12	2	Yes	—	—	—	—	1987-1992	EH207
EH232 ²	Computers and learning	Half	[EH221]	See course description	4	—	Yes	—	—	Yes	Yes	—	Home	Access to group of learners essential for project.	1991-1994	EH232
EM236 ^{2,5}	Learning and teaching mathematics	Half	[EM235]	—	5	—	—	—	—	Yes	Yes	—	Yes	Access to and knowledge of children in classrooms important; work with groups of children needed for TMA's.	1992-1995	EM236
M101 ⁴	Mathematics: a foundation course	Full	[M100] [MS283] MS284 [MST281] [TM281] TM282	—	11	6	—	32	16	Yes	—	CB	Residential school	Calculator required.	1978-1995	M101
M203 ⁵	Introduction to pure mathematics	Full	[M202] [M211] [M212] [M231]	M101	8	—	—	29	—	Yes	—	CB	—	Scientific calculator required.	1980-Indef. ¹⁰	M203
M205	Fundamentals of computing	Full	See course description	—	8	—	—	16	—	Yes	—	—	Home	—	1988-1993 ⁶	M205

Course code	Course title	Credit rating	Excluded combination	Recommended prerequisite	Total number of TMA's	Project work CMAs	Broadcasts TV	Radio	Cassettes Audio	Video	Home kit	Residential school	Computing	Notes	Planned presentation dates (inclusive)	Course code	
M245	Probability and statistics	Half	—	M101 or [MS283]/4	4	4	—	16	—	Yes	—	—	—	Calculator required.	1984-1993 ⁶	M245	
M261	Mathematics in computing	Half	—	M101 or M205 or [MS283]/4 or TM282	4	—	—	—	—	Yes	—	—	—	—	1988-1995	M261	
M332	Complex analysis	Half	—	See course description	4	—	—	—	—	Yes	Yes	—	—	—	1975-1992	M332	
M343 ⁵	Applications of probability	Half	—	M245 and MST204	4	—	—	—	—	Yes	Yes	—	—	Calculator required.	1988-indef. ¹⁰	M343	
M345 ⁵	Statistical methods	Half	—	M245	4	—	—	—	—	Yes	—	Yes	Kit	Calculator required.	1987-1996	M345	
M353	Programming and programming languages	Half	—	See course description	4	—	—	—	—	Yes	—	—	Home	—	1986-1996	M353	
M355	Topics in software engineering	Half	—	See course description	4	—	—	—	—	Yes	—	—	—	—	1990-1995	M355	
M357	Data models and databases	Half	[M352]	M205	4	—	—	8	—	Yes	—	—	Home*	*See course description	1990-1995	M357	
M371 ⁵	Computational mathematics	Half	[M351]	See course description	4	—	—	—	—	Yes	—	—	Home	Scientific calculator required.	1988-1995	M371	
M372 ⁵	Numerical methods for differential equations	Half	—	See course description	4	—	—	—	—	Yes	—	—	Home	Calculator required.	1992-1999	M372	
M381	Number theory and mathematical logic	Half	See course description	M101 and a second-level M course	4	—	—	—	—	Yes	—	—	—	Calculator desirable.	1986-1996	M381	
M431 ⁵	The Lebesgue integral	Half	[M331]	See course description	4	—	—	—	—	Yes	Yes	—	—	—	1992 and 1996	M431	
MA290 ⁵	Topics in the history of mathematics	Half	See course description	—	4	—	—	8	—	Yes	—	—	—	—	1987-1998	MA290	
MDST242 ³	Statistics in society	Half	—	—	4	5	—	8	—	Yes	—	—	—	Calculator required.	1983-1994	MDST242	
ME234 ⁵	Using mathematical thinking	Half	—	—	4	—	—	—	—	Yes	Yes	—	Yes*	Calculator desirable. *See course description.	1989-1996	ME234	
MS284 ⁵	An introduction to calculus	Half	[M100] M101 [MS283] [MST281] [TM281] TM282	—	4	6	—	—	—	Yes	Yes	—	CB	Calculator required.	1992-1999	MS284	
MS323 ⁵	Introduction to non-linear dynamics	Half	—	MST204	4	—	—	—	—	—	—	—	—	—	1990-1998	MS323	
MST204	Mathematical models and methods	Full	[M201] [MST282]	M101 or [MS283]/4 or TM282	8	7	Yes	32	—	Yes	—	—	CB	Residential school Calculator required.	1982-1997	MST204	
MST322 ⁵	Mathematical methods and fluid mechanics	Half	—	See course description	4	—	—	—	—	Yes	Yes	—	—	—	1984-1995	MST322	
S102 ⁴	A science foundation course	Full	[S100] [S101]	—	8	10	—	35	—	Yes	—	Yes	CB	Yes*	*See course description. Calculator required.	1988-1995	S102
S203	Biology: form and function	Full	[S202] [S221] [S223] [S225]	—	8	8	—	32	—	Yes	—	Yes	CB	Yes	1991-indef. ¹⁰	S203	
S236	Geology	Half	[S23-]	S102	4	5	—	16	—	Yes	—	Yes	CB	Outdoor fieldwork.	1983-indef. ¹⁰	S236	
S238	The Earth's physical resources	Half	[S266] [S26-]	S102	4	4	—	17	—	Yes	—	—	CB	Calculator. Field visits.	1984-1992	S238	
S246	Organic chemistry	Half	[S24-]	S102	4	4	—	8	4	Yes	Yes	Yes	DB	*CALCHEM programs available on disk.	1981-indef. ¹⁰	S246	
S247	Inorganic chemistry: concepts and case studies	Half	[S25-]	S102	4	4	—	11	—	Yes	—	Yes	DB	—	1981-indef. ¹⁰	S247	
S256 ⁵	Matter in the Universe	Half	—	See course description	4	5	—	8	—	—	Yes	—	—	Use of a BBC microcomputer desirable.	1985-1992	S256	
S271	Discovering physics	Half	—	S102 or M101 or T102	5*	5	—	16	—	Yes	—	Yes	CB	*Residential school grade included as TMA 05.	1982-indef. ¹⁰	S271	
S272	The physics of matter	Half	[ST285]	S271 and M101 or [MS283]/4 or TM282	4	5	—	11	—	Yes	—	—	CB	—	1986-1996	S272	
S298 ⁵	Genetics	Half	[S299]	S102	4	6	—	10	—	Yes	—	Yes	—	Yes	1987-1994	S298	
S324	Animal physiology	Half	[S321]	S102 and [S202]/S203	4	4	Yes	10	—	Yes	—	—	DB	One day-school.	1985-indef. ¹⁰	S324	
S325 ⁵	Biochemistry and cell biology	Half	[S322]	See course description	4*	3	Yes	8	—	—	Yes	—	DB	*Extended essay, TMA 03.	1986-1993	S325	

Course code	Course title	Credit rating	Excluded combination	Recommended prerequisite	Total number of TMA's	CMA's	Project work	TV	Broadcasts Radio	Cassettes Audio	Video	Home kit	Residential school	Computing	Notes	Planned presentation dates (Inclusive)	Course code
S326	Ecology	Half	[S323]	S102 and [S202]/S203	4	4	Yes	16	—	Yes	—	*	CB**	—	Two TMA's relate to project. *See course description. **Held in April and May.	1986-indef. ¹⁰	S326
S330 ⁵	Oceanography	Half	[S334]	See course description	4	5	—	9	—	Yes	—	—	—	—	—	1989-1996	S330
S339 ^{5,7}	Understanding the continents: tectonic and thermal processes of the lithosphere	Half	[S333] [S336] [S337]	S102 and S236 and [S237]	4	4	—	—	—	—	Yes	Yes	CB	—	Field trips. See course description.	1990-1998 ⁷	S339
S342 ⁵	Physical chemistry: principles of chemical change	Half	—	S102 and S247	4	5	—	7	—	Yes	—	—	CB	Residential school	Scientific calculator required.	1985-indef. ¹⁰	S342
S343 ⁵	Inorganic chemistry	Half	[S304] [S351] [S352]	S102/S246/S247	4	4	—	—	—	Yes	Yes	Yes*	DB	—	*See course description.	1989-1996	S343
S344 ⁵	Organic chemistry: a synthesis approach	Half	[S304] [S351] [S352]	S246	4	4	—	—	—	Yes	Yes	Yes	DB	—	—	1989-1996	S344
S354	Understanding space and time	Half	—	See course description	4	6	—	17	—	Yes	—	—	—	—	—	1979-1995	S354
S365 ⁵	Evolution	Half	[S364]	See course description	4	4	Yes	—	—	Yes	Yes	Yes	—	Optional	See course description.	1992-2001	S365
S442 ⁵	Nmr spectroscopy in chemistry and the life sciences	Half	—	See course description	2	—	Yes	—	—	—	—	—	CB*	—	*Weekend school in April: attendance essential. 1991-1996** **No presentations in 1993 and 1995.	1991-1996**	S442
SD206 ⁵	Biology: brain and behaviour	Full	[SD286] [SDT286]	S102 or D102	8	4	Yes	8	3	Yes	Yes	Yes	CB	Optional	Some practical work at residential school includes use of animals.	1992-1999	SD206
SM355 ⁵	Quantum mechanics	Half	[SM351]	MST204 and S271	4	6	—	—	—	Yes	Yes	—	CB	Residential school	See course description.	1986-indef. ¹⁰	SM355
SMT356 ⁵	Electromagnetism	Half	[SM352]	MST204 and S271	4	6	—	—	—	—	Yes	—	—	Day school	Calculator required.	1991-indef. ¹⁰	SMT356
ST291	Images and information	Half	—	See course description	4	5	—	17	—	Yes	Yes	Yes	—	Home (optional)	Optional 'MERLIN' computer tutorials that can be run on any HCP machine with GEM.	1977-indef. ¹⁰	ST291

For all references to T102 in the recommended prerequisites column, T101 is an acceptable alternative.

T102 ⁴	Living with technology: a foundation course	Full	[T100] [T101] ET217 ¹¹	—	6	7	—	16	8	Yes	—	—	CB	Home	End of course report as well as TMA's.	1989-	T102
T201 ⁵	Materials in action	Full	[T252] T253 T254 T255 [TS251]	T102 and T281 or S102 and S271	8	8	—	8	—	—	Yes	—	CB	—	Calculator required. See course description.	1990-1999	T201
T202	Analogue and digital electronics	Full	[T283] [TS282]	T281 and TM282	8	8	—	—	—	Yes	—	Yes	CB	Home	Scientific calculator and multimeter required.	1990-1999	T202
T223 ⁵	Microprocessor-based computers	Half	[TM221] [TM222]	See course description	4	—	—	—	—	—	—	Yes	—	Home	—	1992-1999	T223
T234	Environmental control and public health	Half	[PT272]	T102 or S102 or T281	4	4	Yes	8	—	Yes	—	Yes	—	—	Calculator an advantage.	1985-1992	T234
T235 ⁵	Engineering mechanics: solids	Half	[T231] [T232]	M101 or [TM281] or TM282	4	8	—	8	—	Yes	—	—	CB	—	Scientific calculator and set of drawing instruments required.	1990-1999	T235
T236 ⁵	Introduction to thermofluid mechanics	Half	[T231] [T233]	[T232]/T235 or TM282	4	8	—	8	—	Yes	*	—	—	—	*May be video cassettes rather than broadcasts.	1992-2001	T236
T244	Managing in organizations	Half	[T242] [T243]	—	4	—	—	5	—	Yes	—	—	DB	—	Extra TV programmes associated with residential school: see Broadcast and Assignment Calendar.	1985-1993	T244
T247	Working with systems	Half	T241	—	4	2	—	4	—	Yes	—	—	DB	Home	—	1991-1998	T247
T253 ⁵	Materials for electronics	Half	T201 [T252] T254 T255 [TS251]	T102 and T281 or S102 and S271	4	4	—	—	—	—	Yes	—	CB	—	See notes for T201: joint school.	1990-1999	T253
T254 ⁵	Stress on materials	Half	T201 [T252] T253 T255 [TS251]	T102 and T281 or S102 and S271	4	4	—	—	—	—	Yes	—	CB	—	See notes for T201: joint school.	1990-1999	T254
T255 ⁵	Materials in manufacturing	Half	T201 [T252] T253 T254 [TS251]	T102 and T281 or S102 and S271	4	4	—	—	—	—	Yes	—	CB	—	See notes for T201: joint school.	1990-1999	T255
T264 ⁵	Design: principles and practice	Half	[T262] [T263]	—	5	—	—	—	—	Yes	Yes	Yes	—	—	—	1992-2000	T264

Course code	Course title	Credit rating	Excluded combination	Recommended prerequisite	Total number of TMA's	Project work	Broadcasts TV	Radio	Cassettes Audio	Video	Home kit	Residential school	Computing	Notes	Planned presentation dates (inclusive)	Course code
T274	Food production systems	Half	[T273]	T102 or S102 or D102	4	6	—	8	—	Yes	—	—	—	Half-day school. Calculator an advantage.	1987-1994	T274
T281	Basic physical science for technology	Half	—	T102 and TM282	4	4	—	8	—	Yes	—	—	—	Calculator required.	1984-1993	T281
T292 ⁵	Instrumentation	Half	[T291]	See course description	4	4	—	3	—	—	—	—	—	—	1986-1993	T292
T301 ⁵	Complexity, management and change: applying a systems approach	Full	[T341] [TD342]	See course description	8	1	Yes	—	—	Yes	—	—	—	Yes* *Use of personal computer with MS-DOS essential for hard systems project option.	1984-1999	T301
T322 ⁵	Digital telecommunications	Half	[T321]	See course description	4	5	—	—	—	Yes	—	—	—	—	1990-1997	T322
T331 ⁵	Engineering mechanics: solids and fluids	Half	—	[T232] T235 and M101 or TM282	4	4	—	2	—	Yes	—	—	—	Scientific calculator essential.	1985-1994	T331
T333 ⁵	Heat transfer: principles and applications	Half	—	[T233]	4	4	—	—	—	—	—	—	—	—	1991-1998	T333
T334 ⁵	Environmental monitoring and control	Half	—	[PT272] or T234	5	—	Yes	—	—	Yes	—	Yes*	—	Access to T234 units and set books and scientific calculator essential. *Optional.	1989-1996	T334
T353 ⁵	Failure of stressed materials	Half	[T351]	See course description	7	—	Yes	8	—	—	—	Yes	—	—	1983-1994	T353
T362 ⁵	Design and innovation	Half	—	—	4	—	Yes	8	—	Yes	—	—	—	—	1986-1994	T362
T363 ⁵	Computer-aided design	Half	—	[T263]	4	—	—	—	—	—	Yes	Yes	—	Home* *See course description.	1987-1994	T363
T393 ⁵	Electronic materials and devices	Half	—	See course description	4	6	—	—	—	Yes	Yes	—	—	—	1984-1994	T393
T394 ⁵	Control engineering	Half	[T391]	See course description	4	5	Yes	—	—	Yes	—	Yes	—	Yes* *Part of home kit.	1986-1993	T394
T401 ^{4,5}	Technology project	Full	—	See course description	—	—	Yes*	—	—	See course description	—	See course description	—	*Three project reports and oral examination.	1979-	T401
TM282	Modelling with mathematics: an introduction	Half	[M100]/M101 [MST281]/[MS283]/4 [TM281]	See course description	7	5	—	8	—	Yes	—	—	—	Scientific hand-held calculator required.	1985-1997	TM282
TM361	Graphs, networks and design	Half	—	See course description	4	6	—	16	—	Yes	—	—	—	Day schools.	1981-1995	TM361
U205	Health and disease	Full	—	—	7	—	—	11	—	Yes	—	—	—	—	1985-indef. ¹⁰	U205
U206	Environment	Full	—	Any foundation course	8	4	Yes	8	—	Yes	—	—	—	—	1991-1998	U206
U207 ⁵	Issues in women's studies	Full	[U221]	—	8	—	Yes	8	11	—	—	—	—	—	1992-1999	U207
U208 ⁵	Third World development	Full	[U204]	—	8	—	—	16	4	Yes	—	—	—	—	1992-1999	U208
K254	Working with children and young people	Half	—	—	4	—	Yes	—	—	Yes	Yes	—	—	—	1990-1996	K254

FOOTNOTES TO TABLE 1

1 Third and fourth level arts courses

The Arts Faculty advises you not to attempt a third or fourth level arts course until you have successfully completed at least one arts course at second level, believing that most students need the practice offered at second level to acquire the higher standard of written expression needed for the higher level courses.

2 Education studies courses

The courses in the School of Education are open not only to professional workers but to anyone who is interested in education. They provide an opportunity for teachers, social workers, parents and others to study together. The courses in the School are not intended to qualify you as a teacher. If you intend to take School of Education courses

you must, like all other students, take a foundation-level course in your first year of study, although there is no foundation course in the School of Education.

3 MDST242

This course, as well as any course with E in the code, can be chosen as part of an approved programme of study in educational studies by students who finally registered with the University before 1981 and are eligible for the award of a discretionary credit exemption on the basis of approved teaching qualifications.

4 Associate programme

We do not plan to include these courses in the associate programme in 1992. D437 is available

only to associate students studying for the RTP1 Diploma by distance learning.

5 Students with disabilities

Recordings of course and supplementary materials (not set books) are available in 1992 from the Office for Students with Disabilities for all courses except those marked 5. If you rely on tapes and want to take any courses marked 5 in 1993 or later, please read the section about course units and set books on audio cassette on page 2.

6 Presentation dates

Faculties hope to extend the presentation of these courses. Please read your Conditional Registration Supplement (sent to you in August) for more information.

7 S338 and S339

S338 *Sedimentary processes and basin analysis* and S339 *Understanding the continents: tectonic and thermal processes of the lithosphere* will be presented in alternate years, S338 in odd-numbered and S339 in even-numbered years.

8 EP228

EP228 *Frameworks for teaching* is available only in the associate programme. See Section 5 for more information.

9 S237

A replacement course for S237 will be presented for the first time in 1993.

10 Indefinite course lives

Because of a change in the University's policy about course lives, some courses are now listed as having an indefinite life (indef.). Such courses will be kept up to date by course teams throughout their presentation. S246 and S247, first presented in 1981, were substantially rewritten in 1991.

11 ET217

ET217 is available only in the associate programme but can be counted as full credit towards the BA degree, where it is treated as a foundation course both for the purpose of the foundation course requirement and for degree classification.

TABLE OF RELATED COURSES

These tables should be used in conjunction with the other sections of Undergraduate Courses 1992.

Unlike other universities, where students are admitted to read a particular degree programme with only limited choices, the Open University offers you an extremely wide and flexible choice of courses. These tables show the areas of study available to Open University undergraduate students; their purpose is to help you find a combination of courses that meets your own needs and interests.

The courses are grouped into 50 tables. Most of the tables are in two sections, with courses central to the area of study in the first section and courses which, although not central, are relevant to the area in the second. The order of the courses within each section is not significant: some are naturally of greater relevance than others, and you must read the General Advice, the faculty overview and the individual course descriptions so that you can judge for yourself which combination of courses to study and in which order. This is particularly important for science courses. In U-courses, the subject-matter crosses both faculty boundaries and the usual discipline boundaries within faculties, and so offers links with other courses in a more than usually varied way. You will need to examine the content of a U-course to get an idea of how it connects with other relevant courses.

The tables include only the undergraduate courses planned for 1992 and those which we hope to present in 1993. You may already have credits for courses which are not listed here. Table III, discontinued courses and their excluded combinations, will help you to judge whether a discontinued course you have taken is a suitable substitute. The arrangement of each table does not indicate prerequisite courses or excluded combinations and you must consult individual course descriptions for this information.

You should not assume that by obtaining any of the combinations of courses indicated in the tables you will necessarily be able to gain recognition by professional or other bodies. For this purpose the tables should be used in

conjunction with the Recognition Information Leaflets (see General Advice, Section 1).

The tables in this section are in no sense intended as prescriptive degree profiles: they merely suggest groupings of courses which you might have overlooked. We hope that they will help you, but please remember that their scope is limited. They are designed to be used in conjunction with all other sections in Undergraduate Courses 1992.

If you need more advice about choosing your courses, please ask your tutor-counsellor.

These tables have been prepared by the Academic Administration (Students) Division on the basis of information provided by the academic areas of the University.

1 ART HISTORY

Courses central to area of study:

A102	An arts foundation course
A204	The Enlightenment
A204	Culture and belief in Europe 1450-1600
A315	Modern art and Modernism: Manet to Pollock
A353	Arts in fifteenth-century Italy
A403	Arts and society in Britain since the thirties (project course)

Other relevant courses:

A206	Enlightenment Europe
A293	Rome: the Augustan age
A294	Fifth-century Athens: democracy and city state

2 BIOLOGY

(See also Science Overview, Fig. 1)

Courses central to area of study:

S102	A science foundation course
S203	Biology: form and function
S298	Genetics
S324	Animal physiology
S325	Biochemistry and cell biology
S326	Ecology
S365	Evolution
SD206	Biology: brain and behaviour

Biology with chemistry

(See also Science Overview, Fig. 2)

Courses central to area of study in addition to those under main heading:

S246	Organic chemistry
S247	Inorganic chemistry: concepts and case studies
S342	Physical chemistry
S343	Inorganic chemistry
S344	Organic chemistry: a synthesis approach

Biology with Earth sciences

(See also Science Overview, Fig. 3)

Courses central to area of study in addition to those under main heading:

S236	Geology
S238	The Earth's physical resources
S330	Oceanography
S338	Sedimentary processes and basin analysis
*S339	Understanding the continents: tectonic and thermal processes of the lithosphere

*Presented in alternate years with S338.

Other courses relevant to studies in biology:

S280	Science matters
DSE202	Introduction to psychology
M245	Probability and statistics
MDST242	Statistics in society
T234	Environmental control and public health
T237	Environmental control and public health
T274	Food production systems
U205	Health and disease
U206	Environment
U207	Issues in women's studies

See also Recognition Information Leaflet 3.8 about associate or full membership of the Institute of Biology.

The courses underlined will be in their last year of presentation in 1992. Those in *italics* are planned for first presentation in 1993.

3 CHEMISTRY

(See also Science Overview, Fig. 2)

Courses central to area of study:

S102	A science foundation course
S246	Organic chemistry
S247	Inorganic chemistry: concepts and case studies
S256	Matter in the Universe
S342	Physical chemistry
S343	Inorganic chemistry
S344	Organic chemistry: a synthesis approach
S442	NMR spectroscopy

Chemistry with biology

(See also Science Overview, Fig. 1)

Courses central to area of study in addition to those under main heading:

S203	Biology: form and function
S298	Genetics
S325	Biochemistry and cell biology

Chemistry with Earth sciences

(See also Science Overview, Fig. 3)

Courses central to area of study in addition to those under main heading:

S236	Geology
S238	The Earth's physical resources
S267	How the Earth works: the Earth's interior
S330	Oceanography
S338	Sedimentary processes and basin analysis

*S339 Understanding the continents: tectonic and thermal processes of the lithosphere

*Presented in alternate years with S338

Chemistry with physics

(See also Science Overview, Fig. 4)

Courses central to area of study in addition to those under main heading:

M101	Mathematics: a foundation course
MS284	An introduction to calculus
S271	Discovering physics
S272	The physics of matter
SM355	Quantum mechanics
T201	Materials in action
T253	Materials for electronics
T254	Stress on materials
T255	Materials in manufacturing
T353	Failure of stressed materials

Other courses relevant to studies in chemistry:

S280	Science matters
T234	Environmental control and public health
T237	Environmental control and public health
T274	Food production systems
TM282	Modelling with mathematics: an introduction
U206	Environment

See also Recognition Information Leaflet 3.8 for professional recognition by the Royal Society of Chemistry.

4 CLASSICAL STUDIES

Courses central to area of study:

A102	An arts foundation course
A204	The Enlightenment
A206	Enlightenment Europe
A293	Rome: the Augustan age
A294	Fifth-century Athens: democracy and city state

Other relevant courses:

A228	The religious quest
MA290	Topics in the history of mathematics

5 COMPUTING AND COMPUTERS

Courses central to area of study:

DT200	An introduction to information technology
M101	Mathematics: a foundation course
M205	Fundamentals of computing
M261	Mathematics in computing
M353	Programming and programming languages
M355	Topics in software engineering
M357	Data models and databases

M371	Computational mathematics
T223	Microprocessor-based computers
T401	Technology project
EH232	Computers and learning

Other relevant courses:

M345	Statistical methods
M372	Numerical methods for differential equations
MS284	An introduction to calculus
MST204	Mathematical models and methods
ST291	Images and information
T102	Living with technology: a foundation course
T202	Analogue and digital electronics
T247	Working with systems
T292	Instrumentation
T322	Digital telecommunications
T363	Computer-aided design
T394	Control engineering
TM361	Graphs, networks and design
TM282	Modelling with mathematics: an introduction

6 DESIGN

Courses central to area of study:

T264	Design: principles and practice
T362	Design and innovation
T363	Computer-aided design
T395	Mechatronics: designing intelligent machines
TM361	Graphs, networks and design

Other relevant courses:

DT200	An introduction to information technology
T102	Living with technology: a foundation course
T201	Materials in action
T202	Analogue and digital electronics
T235	Engineering mechanics: solids
T247	Working with systems
T253	Materials for electronics
T254	Stress on materials
T255	Materials in manufacturing
T301	Complexity, management and change: applying a systems approach
T353	Failure of stressed materials
T401	Technology project

7 EARTH SCIENCES

(See also Science Overview, Fig. 3)

Courses central to area of study:

S102	A science foundation course
S236	Geology
S238	The Earth's physical resources
S267	How the Earth works: the Earth's interior
S330	Oceanography
S338	Sedimentary processes and basin analysis
S339	Understanding the continents: tectonic and thermal processes of the lithosphere

Earth sciences with biology

(See also Science Overview, Fig. 1)

Courses central to area of study in addition to those under main heading:

S203	Biology: form and function
S298	Genetics
S326	Ecology
S365	Evolution
T247	Food production systems
U205	Health and disease

Earth sciences with chemistry

(See also Science Overview, Fig. 3)

Courses central to area of study in addition to those under main heading:

S247	Inorganic chemistry: concepts and case studies
S256	Matter in the Universe
S342	Physical chemistry
S343	Inorganic chemistry
SM355	Quantum mechanics
T254	Stress on materials
T255	Materials in manufacturing

Earth sciences with physics

(See also Science Overview, Fig. 4)

Courses central to area of study in addition to those under main heading:

M101	Mathematics: a foundation course
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CONTENTS

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- 14 Electronics
- 15 Engineering design
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- 20 Geography
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- 22 Government and politics
- 23 Health and health care
- 24 History
- 25 History of ideas
- 26 History of science and technology
- 27 International studies
- 28 Language and communications
- 29 Literature
- 30 Management
- 31 Materials
- 32 Mathematics
- 33 Mathematics, applied and mathematical physics
- 34 Mathematics education
- 35 Methodology
- 36 Modernism in the arts
- 37 Music
- 38 Philosophy
- 39 Physics
- 40 Production engineering
- 41 Psychological studies
- 42 Public sector management
- 43 Religious studies
- 44 Social policy and criminology
- 45 Social studies, applied
- 46 Sociology
- 47 Statistics
- 48 Systems
- 49 Technological systems
- 50 Town planning

MS284	An introduction to calculus
MST204	Mathematical models and methods
S256	Matter in the Universe
S271	Discovering physics
S272	Physics of matter
S354	Understanding space and time
T201	Materials in action
T202	Analogue and digital electronics
T253	Materials for electronics
T254	Stress on materials
T255	Materials in manufacturing
T292	Instrumentation
T353	Failure of stressed materials

Other courses relevant to studies in Earth sciences:

S246	Organic chemistry
S280	Science matters
SM355	Quantum mechanics
T234	Environmental control and public health
T237	Environmental control and public health
TM282	Modelling with mathematics: an introduction
U206	Environment

8 ECONOMICS

Courses central to area of study:

AD280	What is Europe?
D103	Society and social science: a foundation course
D210	Introduction to economics
D212	Running the country
D300	Professional judgment and decision-making
D345	Economics and government policy
M245	Probability and statistics
MDST242	Statistics in society
U208	Third World development

Other relevant courses:

D312	Global politics
D314	Restructuring Britain
DE325	Work and society
E333	Policy-making in education
ED356	'Race', education and society
M101	Mathematics: a foundation course
M345	Statistical methods
MST204	Mathematical models and methods
S238	The Earth's physical resources
T244	Managing in organizations
T264	Design: principles and practice
T274	Food production systems
T362	Design and innovation
U205	Health and disease

9 EDUCATION AND SOCIETY

Courses central to area of study:

E208	Exploring educational issues
E242	Learning for all
E271	Curriculum and learning
E333	Policy-making in education
ED356	'Race', education and society
EH207	Communication and education
EH266	Learning through life: education and training beyond school

Other relevant courses:

D213	Understanding modern societies
D300	Professional judgment and decision-making
DE325	Work and society
DE354	Beliefs and ideologies
DT200	An introduction to information technology
E206	Personality, development and learning
MDST242	Statistics in society
U205	Health and disease
U207	Issues in women's studies

10 EDUCATION FOR YOUTH AND ADULTS

Courses central to area of study:

EH266	Learning through life: education and training beyond school
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Other relevant courses:

E208	Exploring educational issues
E333	Policy-making in education
ED356	'Race', education and society
K254	Working with children and young people

11 EDUCATION, PSYCHOLOGY OF

Courses central to area of study:

E206	Personality, development and learning
E242	Learning for all
E271	Curriculum and learning
E362	Cognitive development: language and thinking from birth to adolescence
EM236	Learning and teaching mathematics

Other relevant courses:

E208	Exploring educational issues
EH207	Communication and education
EH232	Computers and learning
D103	Society and social science: a foundation course
D307	Social psychology
D309	Cognitive psychology
D300	Professional judgment and decision-making
DSE202	Introduction to psychology
MDST242	Statistics in society
ME234	Using mathematical thinking

12 EDUCATIONAL POLICY AND MANAGEMENT

Courses central to area of study:

E325	Managing schools
E326	Managing education in the 1990s
E333	Policy-making in education

Other relevant courses:

D212	Running the country
D300	Professional judgment and decision-making
E208	Exploring educational issues
E242	Learning for all
E271	Curriculum and learning
ED356	'Race', education and society
EH207	Communication and education
EH266	Learning through life: education and training beyond school
MDST242	Statistics in society
T244	Managing in organizations
T301	Complexity, management and change: applying a systems approach

13 EDUCATION — CURRICULUM STUDIES

Courses central to area of study:

E242	Learning for all
E271	Curriculum and learning
ED365	'Race', education and society
EH232	Computers and learning
EM236	Learning and teaching mathematics
ME234	Using mathematical thinking

Other relevant courses:

E208	Exploring educational issues
EH207	Communication and education
MDST242	Statistics in society

14 ELECTRONICS

Courses central to area of study:

T102	Living with technology: a foundation course
T202	Analogue and digital electronics
T223	Microprocessor-based computers
T281	Basic physical science for technology
T292	Instrumentation
T393	Electronic materials and devices
T394	Control engineering
T401	Technology project
TM282	Modelling with mathematics: an introduction
DT200	An introduction to information technology

M101	Mathematics: a foundation course
MS284	An introduction to calculus
S102	Science: a foundation course

Other relevant courses:

M205	Fundamentals of computing
M353	Programming and programming languages
M355	Topics in software engineering
M357	Data models and databases
M371	Computational mathematics

M372	Numerical methods for differential equations
MST204	Mathematical models and methods
S271	Discovering physics
S354	Understanding space and time
SM355	Quantum mechanics
SMT356	Electromagnetism
ST291	Images and information
T201	Materials in action
T235	Engineering mechanics: solids
T253	Materials for electronics
T254	Stress on materials
T255	Materials in manufacturing
T264	Design: principles and practice
T322	Digital telecommunications
T331	Engineering mechanics: solids and fluids
T362	Design and innovation
T363	Computer-aided design
T395	Mechatronics: designing intelligent machines
TM361	Graphs, networks and design

See also Recognition Information Leaflet 3.3 about the requirements of the IEE.

15 ENGINEERING DESIGN

Courses central to area of study:

T102	Living with technology: a foundation course
T201	Materials in action
T202	Analogue and digital electronics
T235	Engineering mechanics: solids
T236	Introduction to thermofluid mechanics
T253	Materials for electronics
T254	Stress on materials
T255	Materials in manufacturing
T264	Design: principles and practice
T281	Basic physical science for technology
T292	Instrumentation
T362	Design and innovation
T363	Computer-aided design
T395	Mechatronics: designing intelligent machines
T401	Technology project
M101	Mathematics: a foundation course

Other relevant courses:

T223	Microprocessor-based computers
T234	Environmental control and public health
T237	Environmental control and public health
T244	Managing in organizations
T331	Engineering mechanics: solids and fluids
T333	Heat transfer: principles and applications
T334	Environmental monitoring and control
T353	Failure of stressed materials
T393	Electronic materials and devices
T394	Control engineering
TM361	Graphs, networks and design
DT200	An introduction to information technology
M205	Fundamentals of computing
M355	Topics in software engineering
ST291	Images and information

16 ENGINEERING MECHANICS

Courses central to area of study:

T102	Living with technology: a foundation course
T201	Materials in action
T234	Environmental control and public health
T235	Engineering mechanics: solids
T236	Introduction to thermofluid mechanics
T237	Environmental control and public health
T253	Materials for electronics
T254	Stress on materials
T281	Basic physical science for technology
T292	Instrumentation
T331	Engineering mechanics: solids and fluids
T333	Heat transfer: principles and applications
T334	Environmental monitoring and control

T353	Failure of stressed materials
T394	Control engineering
T395	Mechatronics: designing intelligent machines
T401	Technology project
TM282	Modelling with mathematics: an introduction
M101	Mathematics: a foundation course
S102	A science foundation course

Other relevant courses:

T223	Microprocessor-based computers
T255	Materials in manufacturing
T264	Design: principles and practice
T363	Computer-aided design
MST204	Mathematical models and methods
MST322	Mathematical methods and fluid mechanics
M372	Numerical methods for differential equations

See Recognition Information Leaflet 3.3 on engineering institutions.

17 ENVIRONMENTAL STUDIES

Courses central to area of study:

D103	Society and social science: a foundation course
S102	Science: a foundation course
T102+	Living with technology
D205	Changing Britain, changing world: geographical perspectives
D437	Conflict and change in the countryside
U206	Environment
S238	The Earth's physical resources
T234	Environmental control and public health
T237	Environmental control and public health
T274	Food production systems
U235	Nuclear weapons: inquiry, analysis and debate

Other relevant courses:

S326	Ecology
T334	Environmental monitoring and control
T401	Technology project

18 EUROPEAN STUDIES

Courses central to area of study:

A204	The Enlightenment
A206	Enlightenment Europe
A205	Culture and belief in Europe 1450-1600
A293	Rome: the Augustan age
A294	Fifth-century Athens: democracy and city state
A314	From Baroque to Romantic: studies in tonal music
A315	Modern art and Modernism: Manet to Pollock
A318	War, peace and social change: Europe 1900-1955
A319	Literature in the modern world
A324	Liberation and reconstruction: politics, culture and society in France and Italy 1943-1954
A353	Art in fifteenth-century Italy
AD280	What is Europe?
AS283	The rise of scientific Europe 1500-1800

Other relevant courses:

A228	The religious quest
A310	Life and death
A317	Themes in British and American history: a comparative approach c1760-1970
A341	Beethoven
D310	Crime, justice and society
D312	Global politics
DE325	Work and society
U205	Health and disease
U207	Issues in women's studies

19 FILM

Courses central to area of study:

A318	War, peace and social change: Europe 1900-1955
A420	Cinema and society: Britain in the 1950s and 1960s

The courses underlined will be in their last year of presentation in 1992. Those in italics are planned for first presentation in 1993.

Other relevant courses:

- A324 Liberation and reconstruction: politics, culture and society in France and Italy 1943-1954

20 GEOGRAPHY

Courses central to area of study:

- D103 Society and social science: a foundation course
D205 Changing Britain, changing world: geographical perspectives
D314 Restructuring Britain
D437 Conflict and change in the countryside
S326 Ecology
U208 Third World development

Other relevant courses:

- AD280 What is Europe?
D212 Running the country
D312 Global politics
M345 Statistical methods
MDST242 Statistics in society
T234 Environmental control and public health
T237 Environmental control and public health
T274 Food production systems
U205 Health and disease
U206 Environment

See also Table 7 *Earth sciences* for courses covering aspects of physical geography, e.g. S236 *Geology* and S238 *The Earth's physical resources*; and Table 48 *Systems*.

21 GEOLOGY

See courses listed under Table 7 *Earth sciences*.

22 GOVERNMENT AND POLITICS

Courses central to area of study:

- AD280 What is Europe?
D103 Society and social science: a foundation course
D211 Social problems and social welfare
D212 Running the country
D308 Democratic government and politics
D310 Crime, justice and society
D312 Global politics
D314 Restructuring Britain
D345 Economics and government policy
D440 Perspectives on revolution
DE354 Beliefs and ideologies
A403 Arts and society in Britain since the thirties (project course)
E333 Policy-making in education
U208 Third World development

Other relevant courses:

- DE325 Work and society
DT200 An introduction to information technology
ED356 'Race', education and society
T244 Managing in organizations
T301 Complexity, management and change: applying a systems approach
U205 Health and disease

23 HEALTH AND HEALTH CARE

Courses central to area of study:

- U205 Health and disease
D300 Professional judgment and decision-making
S203 Biology: form and function
S298 Genetics
S325 Biochemistry and cell biology
A310 Life and death
D211 Social problems and social welfare
SD06 Biology, brain and behaviour
T102 Living with technology
T234 Environmental control and public health
T237 Environmental control and public health

24 HISTORY

Courses central to area of study:

- A102 An arts foundation course
A204 The Enlightenment
A206 Enlightenment Europe
A205 Culture and belief in Europe 1450-1600
A317 Themes in British and American history: a comparative approach c1760-1970
A318 War, peace and social change: Europe 1900-1950
A324 Liberation and reconstruction: politics, culture and society in France and Italy 1943-54
A403 Arts and society in Britain since the thirties (project course)
A420 Cinema and society: Britain in the 1950s and 1960s
AD280 What is Europe?
Other relevant courses:
A231 Religion in post-war Britain: the rise of a multi-cultural society
A293 Rome: the Augustan age
A294 Fifth-century Athens: democracy and city state
A331 Religion in Victorian Britain
A353 Art in fifteenth-century Italy
AS283 The rise of scientific Europe 1500-1800
D312 Global politics
D440 Perspectives on revolution
ED356 'Race', education and society
MA290 Topics in the history of mathematics
U208 Third World development

25 HISTORY OF IDEAS

Courses central to area of study:

- A204 The Enlightenment
A206 Enlightenment Europe
A205 Culture and belief in Europe 1450-1600
A293 Rome: the Augustan age
A294 Fifth-century Athens: democracy and city state
A310 Life and death
A403 Arts and society in Britain since the thirties (project course)
AD280 What is Europe?
D440 Perspectives on revolution
DE354 Beliefs and ideologies
MA290 Topics in the history of mathematics
U205 Health and disease
U207 Issues in women's studies

26 HISTORY OF SCIENCE AND TECHNOLOGY

Courses central to area of study:

- A204 The Enlightenment
A205 Culture and belief in Europe 1450-1600
A282 Science, technology and everyday life 1870-1950
A403 Arts and society in Britain since the thirties (project course)
AS283 The rise of scientific Europe 1500-1800
MA290 Topics in the history of mathematics
S102 A science foundation course
T281 Basic physical science for technology
U205 Health and disease

27 INTERNATIONAL STUDIES

Courses central to area of study:

- D205 Changing Britain, changing world: geographical perspectives
D212 Running the country
D312 Global politics
D308 Democratic government and politics
U235 Nuclear weapons: inquiry, analysis and debate
A318 War, peace and social change: Europe c1900-1955
Other relevant courses:
A324 Liberation and reconstruction: politics, culture and society in France and Italy 1943-1954

- D314 Restructuring Britain
D213 Understanding modern societies

28 LANGUAGE AND COMMUNICATIONS

Courses central to area of study:

- E362 Cognitive development: language and thinking from birth to adolescence
EH207 Communication and education

29 LITERATURE

Courses central to area of study:

- A102 An arts foundation course
A204 The Enlightenment
A206 Enlightenment Europe
A205 Culture and belief in Europe 1450-1600
A319 Literature in the modern world
A361 Shakespeare
A403 Arts and society in Britain since the thirties (project course)
A421 Post-colonial literatures in English
Other relevant courses:
A293 Rome: the Augustan age
A294 Fifth-century Athens: democracy and city state
A315 Modern art and Modernism: Manet to Pollock
A324 Liberation and reconstruction: politics, culture and society in France and Italy 1943-54
EH207 Communication and education
U207 Issues in women's studies

30 MANAGEMENT

Courses central to area of study:

- T102 Living with technology: a foundation course
T244 Managing in organizations
T247 Working with systems
T301 Complexity, management and change: applying a systems approach
T401 Technology project
TM282 Modelling with mathematics: an introduction
D103 Society and social science: a foundation course
D210 Introduction to economics
D300 Professional judgment and decision-making
DT200 An introduction to information technology
E325 Managing schools
E326 Managing education in the 1990s
M245 Probability and statistics
M345 Statistical methods
M355 Topics in software engineering
M357 Data models and databases
MDST242 Statistics in society
Other relevant courses:
DE325 Work and society
K254 Working with children and young people

31 MATERIALS

Courses central to area of study:

- T102 Living with technology: a foundation course
T201 Materials in action
T236 Introduction to thermofluid mechanics
T235 Engineering mechanics: solids
T253 Materials for electronics
T254 Stress on materials
T255 Materials in manufacturing
T281 Basic physical science for technology
T353 Failure of stressed materials
T393 Electronic materials and devices
T395 Mechatronics: designing intelligent machines
T401 Technology project
TM282 Modelling with mathematics: an introduction
S102 Science: a foundation course
Other relevant courses:
T244 Managing in organizations
T264 Design: principles and practice
T292 Instrumentation

- T331 Engineering mechanics: solids and fluids
T333 Heat transfer: principles and applications
T334 Environmental monitoring and control
M101 Mathematics: a foundation course
MST204 Mathematical models and methods
S238 The Earth's physical resources
S271 Discovering physics
ST291 Images and information

Physics of materials

Courses central to area of study:

- T102 Living with technology: a foundation course
T201 Materials in action
T202 Analogue and digital electronics
T253 Materials for electronics
T254 Stress on materials
T255 Materials in manufacturing
T292 Instrumentation
T353 Failure of stressed materials
T393 Electronic materials and devices
TM282 Modelling with mathematics: an introduction
MS284 An introduction to calculus
MST204 Mathematical models and methods
S102 A science foundation course
S271 Discovering physics
S272 The physics of matter
SM355 Quantum mechanics
SMT356 Electromagnetism
ST291 Images and information

32 MATHEMATICS, PURE

Courses central to area of study:

- M101 Mathematics: a foundation course
M203 Introduction to pure mathematics
M332 Complex analysis
M381 Number theory and mathematical logic
M431 The Lebesgue integral
Other relevant courses:
M205 Fundamentals of computing
M245 Probability and statistics
M261 Mathematics in computing
M343 Applications of probability
M345 Statistical methods
M353 Programming and programming languages
M355 Topics in software engineering
M357 Data models and databases
M371 Computational mathematics
MA290 Topics in the history of mathematics
MDST242 Statistics in society
ME234 Using mathematical thinking
MS284 An introduction to calculus
MS323 Introduction to non-linear dynamics
MST204 Mathematical models and methods
MST322 Mathematical methods and fluid mechanics
T322 Digital telecommunications
TM361 Graphs, networks and design

33 MATHEMATICS, APPLIED AND MATHEMATICAL PHYSICS

Courses central to area of study:

- M101 Mathematics: a foundation course
M371 Computational mathematics
M372 Numerical methods for differential equations
MS284 An introduction to calculus
MS323 Introduction to non-linear dynamics
MST204 Mathematical models and methods
MST322 Mathematical methods and fluid mechanics
SM355 Quantum mechanics
SMT356 Electromagnetism
TM282 Modelling with mathematics: an introduction

The courses underlined will be in their last year of presentation in 1992. Those in *italics* are planned for first presentation in 1993.

Other relevant courses:

- M203 Introduction to pure mathematics
M205 Fundamentals of computing
M245 Probability and statistics
M261 Mathematics in computing
M332 Complex analysis
M343 Applications of probability
M345 Statistical methods
M353 Programming and programming languages
M355 Topics in software engineering
M357 Data models and databases
M381 Number theory and mathematical logic
M431 The Lebesgue integral
MDST242 Statistics in society
ME234 Using mathematical thinking
S102 A science foundation course
S271 Discovering physics
S354 Understanding space and time
T223 Microprocessor-based computers
T401 Technology project
TM361 Graphs, networks and design

Many of the courses listed under the following main headings are also relevant: Engineering Mechanics; Materials; Physics.

34 MATHEMATICS EDUCATION

Courses central to area of study:

- EM236 Learning and teaching mathematics
ME234 Using mathematical thinking

Other relevant courses:

- M101 Mathematics: a foundation course
M261 Mathematics in computing
MA290 Topics in the history of mathematics
MS284 An introduction to calculus
EH232 Computers and learning
TM282 Modelling with mathematics: an introduction

Many of the courses listed under the main heading Education — Curriculum Studies are also relevant.

35 METHODOLOGY

Courses central to area of study:

- D102 Society and social science: a foundation course
D300 Professional judgment and decision-making
M245 Probability and statistics
M345 Statistical methods
M355 Topics in software engineering
M357 Data models and databases
MDST242 Statistics in society
MST204 Mathematical models and methods
T244 Managing in organizations
T247 Working with systems
T301 Complexity, management and change: applying a systems approach
U205 Health and disease

Other relevant courses:

- D440 Perspectives on revolution

36 MODERNISM IN THE ARTS

Courses central to area of study:

- A102 An arts foundation course
A315 Modern art and Modernism: Manet to Pollock
A403 Arts and society in Britain since the thirties (project course)

37 MUSIC

Courses central to area of study:

- A102 An arts foundation course
A204 The Enlightenment
A241 Elements of music
A314 From Baroque to Romantic: studies in tonal music
A341 Beethoven
A403 Arts and society in Britain since the thirties (project course)

Other relevant courses:

- A205 Culture and belief in Europe 1450-1600
A206 Enlightenment Europe

38 PHILOSOPHY

Courses central to area of study:

- A102 An arts foundation course
A204 The Enlightenment
A206 Enlightenment Europe
A205 Culture and belief in Europe 1450-1600
A310 Life and death
A403 Arts and society in Britain since the thirties (project course)
AA301 Philosophy of the arts

Other relevant courses:

- A293 Rome: the Augustan age
A294 Fifth-century Athens: democracy and city state
A228 The religious quest
D440 Perspectives on revolution
MA290 Topics in the history of mathematics
U205 Health and disease

39 PHYSICS

(See also Science Overview, Fig. 4)

Courses central to area of study:

- S102 A science foundation course
M101 Mathematics: a foundation course
MS284 An introduction to calculus
MST204 Mathematical models and methods
MST322 Mathematical methods and fluid mechanics
S256 Matter in the Universe
S271 Discovering physics
S272 Physics of matter
S354 Understanding space and time
SM355 Quantum mechanics
SMT356 Electromagnetism
ST291 Images and information

Physics with chemistry

(See also Science Overview, Fig. 2)

Courses central to area of study in addition to those under main heading:

- S247 Inorganic chemistry: concepts and case studies
S342 Physical chemistry
S343 Inorganic chemistry

Physics with Earth sciences

(See also Science Overview, Fig. 3)

Courses central to area of study in addition to those under main heading:

- S267 How the Earth works: the Earth's interior
S330 Oceanography
S338 Sedimentary processes and basin analysis
S339 Understanding the continents: tectonic and thermal processes of the lithosphere

Other courses relevant to studies in physics — there are many such courses, for example:

- S280 Science matters
T281 Basic physical science for technology
T292 Instrumentation
T331 Engineering mechanics: solids and fluids
T393 Electronic materials and devices
U206 Environment

Details of a wide variety of coherent degree profiles that include physics courses (including study routes) have been sent to current students of the courses starting with 'S' in 'Courses central to area of study' above, except S102. If you would like these details please send a medium-sized stamped self-addressed envelope marked 'Coherent Degree Profiles' to Course Support Staff, Physics Department, The Open University, Walton Hall, Milton Keynes MK7 6AA.

You can write to the same address for information about membership of the Institute of Physics. Send a similar envelope, but mark it IOP.

40 PRODUCTION ENGINEERING

See Recognition Information Leaflet 3.3 for the requirements of the Institution of Production Engineers.

41 PSYCHOLOGICAL STUDIES

Courses central to area of study:

- D103 Society and social science: a foundation course
D307 Social psychology
D309 Cognitive psychology
DSE202 Introduction to psychology
E206 Personality, development and learning
SD206 Biology: brain and behaviour

See also Recognition Information Leaflet 3.1 about the British Psychological Society.

Educational psychology

See under main heading and Table II

Psychology with sociology

Courses central to area of study in addition to those under main heading:

- D213 Understanding modern societies
D310 Crime, justice and society
D300 Professional judgment and decision-making
DE325 Work and society
DE354 Beliefs and ideologies
K254 Working with children and young people
MDST242 Statistics in society
U205 Health and disease
U207 Issues in women's studies

42 PUBLIC SECTOR MANAGEMENT

Courses central to area of study:

- D103 Society and social science: a foundation course
D211 Social problems and social welfare
D212 Running the country
D310 Crime, justice and society
D300 Professional judgment and decision-making
D345 Economics and government policy
DE325 Work and society
DT200 An introduction to information technology
E325 Managing schools
E326 Managing education in the 1990s
E333 Policy-making in education
ED356 'Race', education and society
EH207 Communication and education
K254 Working with children and young people
MDST242 Statistics in society
T234 Environmental control and public health
T237 Environmental control and public health
T244 Managing in organizations
T301 Complexity, management and change: applying a systems approach
U205 Health and disease
U208 Third World development

43 RELIGIOUS STUDIES

Courses central to area of study:

- A102 An arts foundation course
A205 Culture and belief in Europe 1450-1600
A228 The religious quest
A231 Religion in post-war Britain: the rise of a multi-cultural society
A293 Rome: the Augustan age
A331 Religion in Victorian Britain
A403 Arts and society in Britain since the thirties (project course)

Other relevant courses:

- A204 The Enlightenment
A206 Enlightenment Europe
A294 Fifth-century Athens: democracy and city state
D103 Society and social science: a foundation course

44 SOCIAL POLICY AND CRIMINOLOGY

Courses central to area of study:

- D103 Society and social science: a foundation course
D211 Social problems and social welfare
D212 Running the Country
D251 Issues in deafness
D310 Crime, justice and society
ED356 'Race', education and society
K254 Working with children and young people

Other relevant courses:

- D213 Understanding modern societies
D300 Professional judgment and decision-making
D307 Social psychology: development, experience and behaviour in a modern world
DSE202 Introduction to psychology
DT200 An introduction to information technology
U205 Health and disease

45 SOCIAL STUDIES, APPLIED

Courses central to area of study:

- AD280 What is Europe?
D103 Society and social science: a foundation course
D211 Social problems and social welfare
D212 Running the country
D251 Issues in deafness
D300 Professional judgment and decision-making
DT200 An introduction to information technology
D310 Crime, justice and society
DE325 Work and society
E271 Curriculum and learning
ED356 'Race', education and society
EH207 Communication and education
EH266 Learning through life: education and training beyond school
K254 Working with children and young people
T234 Environmental control and public health
T237 Environmental control and public health
U205 Health and disease
U208 Third World development

Other relevant courses:

- D213 Understanding modern societies
T244 Managing in organizations
T247 Working with systems
T301 Complexity, management and change: applying a systems approach
T362 Design and innovation
U206 Environment

46 SOCIOLOGY

Courses central to area of study:

- AD280 What is Europe?
D103 Society and social science: a foundation course
D211 Social problems and social welfare
D213 Understanding modern societies
D310 Crime, justice and society
D314 Restructuring Britain
D440 Perspectives on revolution
DE325 Work and society
DE354 Beliefs and ideologies
ED356 'Race', education and society
EH266 Learning through life: education and training beyond school
U207 Issues in women's studies
U208 Third World development

Other relevant courses:

- D212 Running the country
D307 Social psychology
D308 Democratic government and politics
D312 Global politics
DT200 An introduction to information technology
A228 The religious quest
E242 Learning for all
E271 Curriculum and learning
E333 Policy-making in education
EH207 Communication and education
K254 Working with children and young people

The courses underlined will be in their last year of presentation in 1992. Those in italics are planned for first presentation in 1993.

T244 Managing in organizations
 T247 Working with systems
 T301 Complexity, management and
 change: applying a systems
 approach
 U205 Health and disease

47 STATISTICS

Courses central to area of study:

M245 Probability and statistics
 M343 Applications of probability
 M345 Statistical methods
 MDST242 Statistics in society

Other relevant courses:

D300 Professional judgment and
 decision-making
 M101 Mathematics: a foundation course
 MS284 An introduction to calculus
 MST204 Mathematical models and methods
 S326 Ecology
 TM361 Graphs, networks and design
 U205 Health and disease

48 SYSTEMS

Courses central to area of study:

T244 Managing in organizations
 T247 Working with systems
 T274 Food production systems
 T301 Complexity, management and
 change: applying a systems
 approach
 TM282 Modelling with mathematics: an
 introduction

Systems management and decision-making

Other relevant courses in addition to courses
 under main heading:

AD280 *What is Europe?*
 D212 Running the country
 D300 Professional judgment and
 decision-making
 E325 *Managing schools*
 E326 *Managing education in the 1990s*
 E333 Topics in software engineering
 M357 Data models and databases
 M245 Probability and statistics
 M345 Statistical methods
 MDST242 Statistics in society

Systems, society and environment

Other relevant courses in addition to courses
 under main heading:

T234 Environmental control and public
 health
 T237 *Environmental control and public
 health*
 T264 Design: principles and practice
 T362 Design and innovation

T401 Technology project
 D205 Changing Britain, changing world:
 geographical perspectives
 D312 Global politics
 DT200 An introduction to information
 technology
 U205 Health and disease
 U208 Third World development

49 TECHNOLOGICAL SYSTEMS

Courses central to area of study:

T102 Living with technology: a
 foundation course
 T234 Environmental control and public
 health
 T237 *Environmental control and public
 health*
 T244 Managing in organizations
 T247 Working with systems
 T274 Food production systems
 T281 Basic physical science for
 technology
 T292 Instrumentation
 T301 Complexity, management and
 change: applying a systems
 approach
 DT200 An introduction to information
 technology
 M101 Mathematics: a foundation course

Other relevant courses:

DE325 *Work and society*
 T223 Microprocessor-based computers
 T264 Design: principles and practice
 T322 Digital telecommunications
 T362 Design and innovation
 T363 Computer-aided design
 T394 Control engineering
 T401 Technology project
 M345 Statistical methods
 MST204 Mathematical models and methods

50 TOWN PLANNING

Courses central to area of study:

D103 Society and social science: a
 foundation course
 T102 Living with technology: a
 foundation course

Other relevant courses:

AD280 *What is Europe?*
 D205 Changing Britain, changing world:
 geographical perspectives
 D212 Running the country
 D437 Conflict and change in the
 countryside
 MDST242 Statistics in society
 T264 Design: principles and practice
 T362 Design and innovation

See Recognition Information Leaflet 3.2 about
 the Royal Town Planning Institute.

TABLE OF DISCONTINUED COURSES WHICH FORM EXCLUDED COMBINATIONS — 1992

TABLE III

This table shows all BA degree courses that have been discontinued, together with their years of presentation and the courses (if any) with which they form excluded combinations. Only existing courses are included in the lists of excluded combinations; no proposed courses described in Section 4 of this publication are listed.

As well as helping you to recognize excluded combinations in relation to a discontinued course you may have taken, the table will help you to assess whether a discontinued course serves as a recommended prerequisite for a course you are thinking of taking. In Table I,

Table II and the 'Notes for Prospective Students' in each course description, discontinued courses are identified by square brackets. Unless otherwise stated, you can assume that the predecessor(s) of a current course will serve as an alternative prerequisite to the course in

question (but please see footnote to part-cert science courses). More advice about recommended prerequisites is given in the overview to each faculty and the U area, and it is important that you read this advice before registering for a course.

DISCONTINUED COURSES		PRESENTATION EXCLUDED COMBINATIONS		DISCONTINUED COURSES		PRESENTATION EXCLUDED COMBINATIONS	
A100	Humanities: a foundation course	1971-1977	[A101] A102	D424 ⁹	Family, work and community in nineteenth-century England	1982-1983	
A101	Arts: a foundation course	1978-1986	[A100] A102	D425 ⁹	What reform for Britain's constitution?	1982-1983	
A201	Renaissance and Reformation	1972-1980		D426 ⁹	Sociology and psychoanalysis	1983-1984	
A202	The age of revolutions	1972-1979				1986-1987	
A203	Seventeenth-century England: a changing culture 1618-1689	1981-1989		D428 ⁹	Housing, residential and social change in the city	1983-1984	[D433]
A281	Technology and change c1750-1914	1984-1991	[AST281] A293	D429 ⁹	Political economy in China since the death of Mao Tse Tung	1984-1985	
A291	The early Roman Empire and the rise of Christianity	1974-1981		D430 ⁹	Kinship, marriage and family: anthropological perspectives	1985-1986	D310
A292	Greece 478-336 BC	1979-1988	A294	D431 ⁹	The sociology of youth, crime and violence	1985-1986	
A301	War and society	1973-1979	[A309] A318				
A302	The nineteenth-century novel and its legacy	1973-1978	[A312]	D432 ⁹	Rural geography in England and Wales 1855-1955	1985 only	
A303	Problems of philosophy	1973-1980	[A313]	D433 ⁹	Housing in Britain 1885-1985	1985, 1987 only	[D428]
A304	The development of instruments and their music	1974-1983		D434 ⁹	Wales: a study of cultural and national identity	1986-1987	[D423]
A305	History of architecture and design 1890-1939	1975-1982		D435 ⁹	Perspectives in family studies	1988-1989	
A306	Twentieth-century poetry	1976-1983		D436 ⁹	Australian perspectives: social issues and the British connection	1988-1989	
A307	Drama	1977-1981					
A308	The rise of modernism in music 1890-1935	1979-1986		D438 ⁹	Current issues in public service management	1989-1990	
A309	Conflict and stability in the development of modern Europe c1789-1970	1980-1989	[A301] A318	DE206	Social work, community work and society	1978-1983	
A311	Reason and experience	1983-1991		DE304	Research methods in education and the social sciences	1979-1991	[E341]
A312	The nineteenth-century novel and its legacy	1982-1990	[A302]	DE351	People and work	1976-1981	DE325
A313	Philosophical problems	1981-1985	[A303]	DE353	Mass communication and society	1977-1983	
A321	The revolutions of 1848	1976-1981		DS261	An introduction to psychology	1974-1980	[DS262] DSE202
A322	English urban history 1500-1780	1977-1983		DS262	Introduction to psychology	1981-1989	[DS261] DSE202
A323	Weimar Germany: the crisis of industrial society 1918-1933	1988-1989		DT201	Urban development	1973-1978	[D202]
A351	Modern art from 1848 to the present: styles and social implications	1976-1982		DT352	People and organizations	1974-1979	
A352	Art in Italy 1480-1580	1979-1989					
A362	Romantic poetry	1984-1991		E200	Contemporary issues in education	1981-1988	E208 [E220] HEP228 ¹¹
A381	Science and belief: from Darwin to Einstein	1981-1987		E201	Personality and learning	1976-1984	E206 [E281]
A401	Great Britain 1750-1950: sources and historiography	1974-1982		E202	Schooling and society	1977-1983	[E205] [E282]
A402	Thought and reality: central themes in Wittgenstein's philosophy	1976-1982		E203	Curriculum design and development	1976-1982	[E204] [E283] E271
AD208	Man's religious quest	1978-1985	A228	E204	Purpose and planning in the curriculum	1983-1988	[E203] [E283] E271
AM289	History of mathematics	1976-1985		E205	Conflict and change in education: a sociological introduction	1984-1988	[E202]
AMST283	Science and belief: Copernicus to Darwin	1974-1981		E220 ¹⁰	Contemporary issues in schools	1987 only	[E200] E208 EP228 ¹¹
AST281	Science and the rise of technology since 1800	1973-1980	[A281] AS283	E221	Decision-making in British education systems	1974-1978	[E222]
				E222	The control of education in Britain	1979-1985	[E221] E333
D100	Understanding society: a foundation course	1971-1974	[D101] [D102] D103	E241	Special needs in education	1982-1991	E242
D101	Making sense of society	1975-1981	[D100] [D102] D103	E262	Language and learning	1973-1978	[E263]
D102	Social sciences: a foundation course	1982-1990	[D100] [D101] D103	E263	Language in use	1981-1986	[E262]
D202	Urban change and conflict	1982-1988	[DT201]	E281	Personality, growth and learning	1972-1975	[E201] E206
D203	Decision-making in Britain	1972-1982	[D208] D212	E282	School and society	1972-1976	[E202]
D204	Fundamentals of human geography	1977-1984	[D281]	E283	The curriculum: context, design and development	1972-1975	[E203] [E204] E271
D207	An introduction to sociology	1981-1990	[D283] D213	E321	Management in education	1976-1980	[E323] E325
D208	Decision-making in Britain	1983-1990	[D203] D212	E323	Management and the school	1981-1987	[E321] E325
D209	State and society	1984-1991		E324	Management in post-compulsory education	1984-1991	
D222	Microeconomics	1973-1984	D210	E341	Methods of educational enquiry: an empirical approach	1973-1980	DE304
D231	Comparative government and politics	1974-1978	[D232]	E351	Urban education	1974-1977	[E361]
D232	Comparative politics	1979-1986	[D231]	E352	Education, economy and politics	1973-1978	[E353]
D233	World politics	1981-1988	[D332]	E353	Society, education and the state	1981-1985	[E352]
D281	New trends in geography	1972-1976	[D204]	E354	Ethnic minorities and community relations	1982-1988	ED356
D282	National income and economic policy	1972-1978	D210 [D284]	E355	Education for adults	1984-1991	EH266
D283	The sociological perspective	1972-1980	[D207] D213	E361	Education and the urban environment	1978-1982	[E351]
D284	National income and economic policy	1979-1984	D210 [D282]	E364	Curriculum evaluation and assessment in educational institutions	1982-1986	
D291	Statistical sources	1975-1984 ⁸		ED322	Economics and education policy	1977-1982	
D301	Historical sources and the social scientist	1974-1988		EH221	Educational computing	1987-1990	EH232
D302	Patterns of inequality	1976-1981		EM235	Developing mathematical thinking	1982-1991	EM236
D303	Cognitive psychology	1978-1985	D309				
D305	Social psychology	1976-1984	D307				
D306	A guided project in human geography	1981-1986					
D321	Professional judgment	1988-1991	D300				
D323	Political economy and taxation	1979-1984	D345				
D324	Business economics	1980-1987					
D331	Public administration	1974-1979	[D336]	M100	Mathematics: a foundation course	1971-1977	M101 MS283 MS284 [MST281] [TM281] TM282
D332	International politics and foreign policy	1975-1980	[D233]	M201	Linear mathematics	1972-1981	MST204
D333	Soviet government and politics	1976-1979	[D334]	M202 ¹	Topics in pure mathematics	1973-1978	M203 [M211] [M212] [M382] [M384] M386
D334	Soviet government and politics	1982-1987	[D333]				[M202] M203
D335 ⁶	Issues in crime and society	1982-1987	D310 ⁶	M211	An introduction to algebra and geometry	1979 only	
D336	Policies, people and administration	1980-1986	[D331]	M212	Introduction to analysis and topology	1980 only	[M202] M203 [M231]
D342	Regional analysis and development	1974-1978		M231	Analysis	1974-1980	M203 [M212]
D355	Social policy and social welfare	1984-1989		M251	An algorithmic approach to computing	1973-1981	[M252] [PM252] [PM951]
D422 ⁹	Financial institutions and monetary policy	1982-1983					
D423 ⁹	Wales: a study of cultural and national identity	1982-1983	[D434]	M252 ⁷	Computing and computers	1982-1987	M205 ⁷ [M251] PM252 [PM951]

DISCONTINUED COURSES		PRESENTATION	EXCLUDED COMBINATIONS	DISCONTINUED COURSES	PRESENTATION	EXCLUDED COMBINATIONS	
M321	Partial differential equations of applied mathematics	1974-1982		S334	Oceanography	1978-1987	S330
M331	Integration and normed spaces	1975-1980	M431	S335	Surface and sedimentary processes: case studies in Earth science	1980-1985	[S333] [S337] S338*
M333	Aspects of abstract algebra	1980-1990		S336	Crustal and mantle processes	1980-1988	[S333] [S337] S339*
M334	Differential geometry	1976-1990		S337	Earth science topics and methods (Part II)	1980-1981	[S335] [S336] S338* S339*
M335 ^{1,5}	Studies in pure mathematics	1981-1985	See notes 1,5	S341	Photochemistry: light, chemical change and life	1982-1991	
M341	Fundamentals of statistical inference	1977-1985		S351	The nature of chemistry (Part I)	1976 only	[S304] S343 S344 [S352]
M351	Numerical computation	1976-1987	M371	S352	The nature of chemistry (Part II)	1977 only	[S304] S343 S344 [S351]
M352	Computer-based information systems	1980-1989	M357	S364	Evolution	1981-1990	S365
M382 ⁵	Number theory and metric and topological spaces	1986-1989	[M202] M381 [M383] [M384] [M386]	S431	Directed studies course in Earth sciences: geology projects in the Lake District	1986-1989	
M383 ⁵	Number theory and geometric topology	1986-1989	M381 [M382] [M385] [M386]	S441	Directed studies course in chemistry: exploring the chemistry of a neurotransmitter	1986-1990	
M384 ⁵	Mathematical logic and metric and topological spaces	1986-1989	[M202] M381 [M382] [M385] [M386]	SD286	Biology, brain and behaviour	1981-1990	[SDT286] SD206
M385 ⁵	Mathematical logic and geometric topology	1986-1989	M381 [M383] [M384] [M386]	SDT286	Biological bases of behaviour	1972-1980	[SD286] SD206
M386	Metric and topological spaces and geometric topology	1986-1991	[M202] [M382] [M383] [M384] [M385]	SM351	Quantum theory and atomic structure	1974-1985	SM355
MDT241	Statistics: an interdisciplinary approach	1974-1983	[M100] M101 [MST281] MS284 [TM281] TM282	SM352	Electromagnetism	1980-1990	SMT356
MS283	An introduction to calculus	1979-1991	[M100] M101 MS283 MS284 [TM281] TM282 MST204	ST285	Solids, liquids and gases	1973-1981	S272
MST281	Elementary mathematics for science and technology	1972-1978		ST294	Principles of chemical processes	1975-1984	
MST282	Mechanics and applied calculus	1972-1982					
P232 ¹⁰	Language development	1979 only	E262 [PE232] [P853] [PD251]	T100	The man-made world: a foundation course	1971-1979	ET217 ¹¹ [P891] [PET271] [T101] T102 ET217 ¹¹ [T100] T102
P251	The handicapped person in the community	1977-1988		T101	Living with technology: a foundation course	1980-1988	
P252 ¹⁰	An ageing population	1979-1984		T231	Introduction to engineering mechanics	1975-1978	[T232] [T233] T235 T236
P253 ¹⁰	Conflict in the family	1980-1984		T232	Engineering mechanics: solids	1980-1989	[T231] T235
P853 ¹⁰	The handicapped person in the community	1975-1976	[P251] [PD251]	T233	Thermofluid mechanics and energy	1982-1991	[T231] T236
P881	Industrial relations	1976-1978	[PT281]	T241	Systems behaviour	1973-1990	T247
P891 ¹⁰	Technology for teachers	1975-1976	[PET271] [T100]	T242	Systems management	1974-1979	[T243] T244
PD251	The handicapped person in the community	1977-1978	[P251] [P853]	T243	Systems organization: the management of complexity	1980-1984	[T242] T244
PE231	Reading development	1977-1985	[PE261]	T252	Engineering materials: an introduction	1982-1989	[TS251] T201 T253 T254 T255
PE232	Language development	1980-1986		T262	Man-made futures: design and technology	1975-1982	[T263] T264
PE261	Reading development	1973-1976	[PE231]	T263	Design processes and products	1983-1991	[T262] T264
PET271	Technology for teachers	1976-1981	[P891] [T100]	T273	Food production systems	1978-1985	T274
PM252	Computing and computers	1982-1983	M205 [M251] [M252] [PM951] [M251] [M252] [PM252]	T283	Introductory electronics	1980-1989	T202 [TS282]
PM951	Computing and computers	1978-1981		T291	Instrumentation	1974-1985	T292
PME233	Mathematics across the curriculum	1980-1988		T321	Telecommunications systems	1976-1986	T322
PT272	Environmental control and public health	1976-1982	T234	T326	Electronic signal processing	1984-1991	
PT281	Industrial relations	1979-1984	[P881]	T341	Systems modelling	1975-1982	T301
S100	Science: a foundation course	1971-1978	[S101] S102	T351	Materials under stress	1976-1982	T353
S101	Science: a foundation course	1979-1987	[S100] S102	T352	Materials processing	1979-1986	
S2-1 ^{2,3}	Biochemistry	1972-1980	See note 3	T361	Control of technology	1978-1985	
S2-2 ^{2,4}	Geochemistry	1974-1980	See note 4	T391	Control engineering	1978-1985	T394
S202	Biology: form and function	1981-1990	[S22-] [S2-1] [S2-3] [S2-5] S203	T392	Engineering product design	1984-1991	
S22-2	Comparative physiology	1972-1980	[S202] S203	TAD292	Art and environment	1976-1985	T301
S2-3 ^{2,3}	Environment	1972-1982	See note 3	TD342	Systems performance: human factors and systems failures	1976-1983	
S23-2	Geology	1972-1982	S236	TM221	The digital computer	1975-1982	[TM222] T223
S237	The Earth: structure, composition and evolution	1981-1991	[S2-2] [S2-4]	TM222	The digital computer	1983-1991	[TM221] T223
S2-4 ^{2,4}	Geophysics	1974-1980	See note 4	TM281	Modelling with mathematics	1977-1984	[M100] M101 MS283 MS284 [MST281] TM282
S24-2	An introduction to the chemistry of carbon compounds	1974-1980	S246	TS251	An introduction to materials	1973-1981	T201 [T252] T253 T254 T255
S2-5 ^{2,3}	Genes and development	1973-1980	See note 3	TS282	Electromagnetics and electronics	1972-1979	T202 [T283]
S25-2	Structure, bonding and the periodic law	1972-1980	S247				
S26-2	The Earth's physical resources	1974-1975	[S266] S238				
S266	The Earth's physical resources	1976-1983	[S26-] S238				
S299	Genetics	1976-1985	S298	U201	Risk	1980-1984	
S304	The nature of chemistry	1978-1987	S343 S344 [S351] [S352]	U202	Inquiry	1981-1984	
S321	Physiology of cells and organisms	1974-1982	S324	U203	Popular culture	1982-1987	
S322	Biochemistry and molecular biology	1977-1985	S325	U204	Third World studies	1983-1991	U208
S323	Ecology	1974-1985	S326	U221	The changing experience of women	1983-1991	U207
S333	Earth science topics and methods (Part I)	1976-1979	[S335] [S336] S338* S339*	U235	Nuclear weapons: inquiry, analysis, and debate	1986-1991	

Footnotes:

- [M202] was an excluded combination with the third of the four options contained in [M335].
- These are part-credit courses and it cannot be assumed that one of them will be a suitable prerequisite for a current course. Please read the Science Faculty Overview for advice about prerequisites for science courses.
- A combination of this course and [S22-] (i.e. S221, S223 and S225) forms an excluded combination with [S202].
- [S2-2] and [S2-4] jointly (not individually) form an excluded combination with S237.
- Previously offered as separate options within [M335]. You may not count for credit courses with a common option: if you have a credit in [M335] you will be considered to have taken the options in which you presented yourself at the examination. (If you answered questions in more than two options of [M335] you will be considered to have taken the options in which you presented yourself at the examination.)
- If you have successfully completed [D335] but have not had it included in the award of a BA degree you may register for D310 on condition that if you pass D310 you must relinquish the half credit previously awarded for [D335].
- If you have successfully completed [M252] but have not had it included in the award of a BA degree you may register for M205 on condition that if you pass M205 you must relinquish the half credit previously awarded for [M252].
- No presentation in 1977.
- A maximum of two social science guided study courses may be included within a degree profile. D421 is the general code for all social science guided study courses; each course has its own code.
- Associate programme only, but counted for credit towards the BA degree.
- Presented in alternate years.

OVERVIEW

The first half of the arts foundation course (A102) introduces the disciplines of history, literature, music, art history and philosophy. The rest of the course builds on these introductions with an interdisciplinary study of culture and society in Britain 1850-90, which also includes study of religion and the history of science.

Interdisciplinary work is extended and consolidated at second level. It contributes to the breadth of study necessary in a general degree as well as to the development of more specialist skills needed for higher level work. The two main courses are A204 *The Enlightenment and A205 Culture and belief in Europe 1450-1600* (both full-credit courses). These courses draw on a wide range of disciplines and are highly integrated. Interdisciplinary work designed to complement A204 and A205 is also available at second level in two half-credit courses which extend the historical and cultural perspective on the ancient world, A293 *Rome: the Augustan age* and A294 *Fifth-century Athens: democracy and city state*; in a half-credit course A228 *The religious quest which considers the historical and social context of six religions and their sacred literatures*; and in half-credit courses in the history of science, AS283 *The rise of scientific Europe 1500-1800* and A282 *Science, technology and everyday life 1870-1950*.

Because of the special technical needs of music, there is at second level a half-credit course on the *Elements of music* (A241).

Third-level arts courses offer you an opportunity to study the concerns and methods of individual disciplines in depth and to pursue interdisciplinary studies at a higher level of complexity and sophistication. These courses meet the requirements of students working for an honours degree, foster more independent learning and provide sufficient foundation for postgraduate study. Each of the five main disciplines usually offers two full credits at this level. Literature offers A319 *Literature in the modern world* and at present one half credit, A361 *Shakespeare*. History offers A317 *Themes in British and American history: a comparative approach c. 1760-1970* and A318 *War, peace and social change: Europe 1900-1955*. Philosophy offers A310 *Life and death* and AA301 *Philosophy of the arts*. At present music offers one and a half credits at third level: A314 *From Baroque to Romantic: studies in tonal music* (full credit) and A341 *Beethoven* (half credit). Art history also offers one and a half credits at third level: A315 *Modern art and Modernism: Manet to Pollock* (full credit) and A353 *Art in fifteenth-century Italy* (half credit). Interdisciplinary work at third level is offered in two half-credit courses, A324 *Liberation and reconstruction: politics, culture and society in France and Italy 1943-54* and A331 *Religion in Victorian Britain*.

The Arts Faculty profile is rounded off by the fourth-level project course A403 *Arts and society in Britain since the thirties*, in which you can carry through your project either in a single discipline of your own choice or in a relevant interdisciplinary topic.

In general a structured profile in arts would look like this:

- Foundation

Arts foundation course. Although it is no longer obligatory, a second foundation course remains a desirable prerequisite for third-level study in the arts. Students who have no advanced standing awards, in particular, benefit from the support that they receive at foundation level in the first two years of their undergraduate studies. If you do not intend to take two foundation courses you are advised to move on to post-foundation study through A204 or A205.

- Second level

One or other, or both, of A204 *The Enlightenment* and A205 *Culture and belief in Europe 1450-1600* with, possibly, further credits from A228 *The religious quest* or A293 *Rome: the Augustan age* or A294 *Fifth-century Athens: democracy and city state*; or AS283 *The rise of scientific Europe 1500-1800* or A282 *Science, technology and everyday life 1870-1950*; or a credit could be taken from the 'U' area. A credit from social sciences at this level would also be appropriate.

- Third level

Here you could do two credits in the single arts discipline of your choice; or divide two credits between arts subjects. Two arts full-credit equivalents at third level are recommended strongly for entry into A403.

- Fourth level

A403 *Arts and society in Britain since the thirties*. Please read the course description of A403 for details of entry requirements and recommended prerequisites.

We recommend that if you are concentrating on arts subjects you take one social science course, a 'U' area course or a course from any other faculty and a half credit in the history of science.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and presentation dates are listed in Table III.

A102

AN ARTS FOUNDATION COURSE

Foundation level: full credit

This course offers a systematic introduction to the arts disciplines — history, literature, music, art history and philosophy. Through the study of culture and society in Britain 1850-1890, which takes up the second half of the course, it also encourages you to see how the individual disciplines relate to each other.

The course has four aims:

- To stimulate your interest in and enthusiasm for the study of the arts, and to provide a basis for further more detailed study at post-foundation level.
- To help you develop the basic skills of clear and logical thinking, of selecting relevant material, interpreting it, and expressing yourself in good English prose; and to introduce you to what is meant by education and the learning process at university level.
- To introduce the separate purposes and methods of the different disciplines in the arts.
- To stress the general idea that the arts disciplines should not be kept in separate compartments, but can and should be brought together both in the study of particular problems and in any comprehensive study of the values and standards of society. This idea will be developed in an interdisciplinary study of 'Culture and Society in Britain, 1850-90'.

Content You will begin by studying the five main disciplines taught in the Arts Faculty, spending three weeks on each. During this period the separate purposes and methods of each discipline will be introduced. The first part of the course provides a firm foundation for the work in the second part of the course, when you will need to draw upon the practical skills and insights you have begun to develop and apply them to an interdisciplinary study. This is important, for in order to appreciate the particular problems, values and standards of Victorian Britain, the disciplines must be brought together to do justice to the complexities involved.

Part I

Introduction to history (Units 1-3) These units introduce the nature, importance, and methods of historical study. Most of the examples will be drawn from Britain 1850-90 so that, although the main purpose of the units is to introduce history as an academic discipline, they also serve to introduce the period which is the basis of the interdisciplinary study in the second part of the course.

Introduction to literature (Units 4-6) This is divided into six sections, each dealing with some of the principal issues involved in the study of literature. These include the basic question: what do we mean by 'literature'? A variety of texts are studied, including short stories by James Joyce and Kipling, several poems and Dickens' novel *Hard Times*. You will study the formal aspects of these works together with the more general

problems of literary interpretation.

Introduction to music (Units 7-9) The introduction to music begins somewhat similarly by asking what music is. It then considers how we listen to music, and concentrates on developing aural and analytical skills. You work on very short musical examples to begin with, gradually moving on to longer ones. By the third week you will meet the more complex musical genres of symphony (Berlioz, *Symphony fantastique*) and oratorio (Handel's *Messiah*), and begin to consider how the development of such genres relates to their historical context (work that you will draw upon in the second part of the course).

Introduction to art history (Units 10-12) These units begin with the questions what is art history, and what is art? They then concentrate on the problems associated with the evolution of the genres of art (for example, portraiture and landscape). The units and the set text work in a complementary way to explore the problems of representation and meaning in the visual arts. The units are illustrated with examples from all periods of Western art.

Introduction to philosophy (Units 13-15) This is in two parts. The first is concerned with the moral theory known as utilitarianism, the second asks whether a 'scientific' approach to human beings involves denying that they have free will. You study some of the writings of the Victorian philosopher John Stuart Mill, and, again, this will provide a foundation for some of your later work in the course.

Part II

The Great Exhibition: re-reading *Hard Times* (Unit 16) The first part of Unit 16 examines an important cultural event, the Great Exhibition of 1851; you are then asked to re-read *Hard Times*. **Interdisciplinary study: an introduction** (Unit 17) recapitulates some of the main points made in the first part of the course and then introduces the ten topics which form the basis of your interdisciplinary study of Victorian Britain 1850-90.

Religion: conformity and controversy (Units 18-19) is one of the ten topics of the interdisciplinary study; but these units also bring in the second topic, 'Science'. In order to show the all-pervasive effects of Victorian religion, examples are drawn from music, poetry and painting. **Moral values and the social order** (Units 20-21), while based mainly on philosophical and historical writings, also brings in imaginative literature.

Culture: production, consumption and status (Units 22-26) In the five weeks in which you study these units you will examine various meanings of the term 'culture', and explore a wide range of 'cultural products' and the nature of their relationship to their social context. The cultural products include paintings, music, music-halls, trade union banners, popular poetry and religion, as well as Dickens' *Hard Times* once more, and the writings of Matthew Arnold. The units also refer to two of our other topics: 'Working class culture and the Labour Movement', and 'The role and status of women'.

The representation of the people (Units 27-28) The position of the working class and of women is touched on, though the units draw mainly on philosophical arguments and historical material in studying the contemporary debate over the franchise and its reform.

Town and country (Units 29-30) examines some of the facts and fictions about 'Town and country'. You will be studying 'facts', such as who lived where and in what kind of housing, and 'fictions' such as pastoral images of the countryside as represented in contemporary paintings and poetry.

Conclusion (Units 31-32) To help you with revision, these units illustrate the way in which the ten topics are woven together in the second part of the course, bringing out the significance of topics such as 'Economic, social and technological developments' and 'Historicism and the concept of progress'. These units help to highlight and summarize the changes that took place between 1850 and 1890. You are also given practical advice and exercises to help you prepare for the examination.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [A100], [A101].

Assessment Eight TMAs (50%) and the examination (50%). TMA 08 takes the form of a mock examination and is not assessed. Substitution is allowed for up to two TMAs from TMAs 01-05 and 07 but not for TMA 06. You will progress from writing single-discipline essays to interdisciplinary essays. The choice of assignments includes some which require reference to the broadcast material.

Broadcasts The thirty-two TV and sixteen radio broadcasts are an important part of the course and we have used the special characteristics of radio and television to enhance your appreciation of the issues dealt with in the units. The programmes that accompany the first part of the course have two roles; they exemplify some of the purposes, assumptions and methods of arts study and they illustrate the work of eminent practitioners of history, literature, music etc.

Cassettes Four 90-minute and one 60-minute audio cassettes are included in the course material.

Residential school A one-week course-based summer school. The school has been planned with the aims of increasing your enjoyment of the arts and your confidence in studying them; of increasing your ability to learn from discussion with others; of consolidating and extending your study in the five main discipline areas of the Arts Faculty (art history, history, literature, music and philosophy); of developing your skills in the interdisciplinary study in the arts which forms Units 16-32 of the course.

Students with disabilities If you have a disability that may prevent you from completing assignments in such disciplines as art history or music, or you find you are not able to range as widely in interdisciplinary questions as might be wished, you should consult your tutor, who will ensure that such problems receive sympathetic attention. No substantial difficulties are expected.

Preparatory reading In the autumn, before you begin A102, you will receive the preparatory pack *Preparing for the Arts Foundation Course*. Some regions provide additional advice about preparation, although the A102 course team does not regard extra preparation as necessary. However, you should read two of the set books before the course begins: Geoffrey Best *Mid-Victorian Britain 1851-1875* and Charles Dickens *Hard Times*. If you have the time to read more widely we recommend E. H. Gombrich (1950) *The Story of Art*; Phaidon; A. O'Hear (1985) *What Philosophy Is*, Pelican.

Set books G. Best *Mid-Victorian Britain*, Fontana. C. Dickens *Hard Times*, Oxford University Press. E. H. Gombrich *Art and Illusion*, Phaidon. Course reader: J. M. Golby (ed.) *Culture and Society in Britain 1850-1890: a source book of contemporary writings*, Oxford University Press, produced specially for A102.

A204

THE ENLIGHTENMENT

Second level: full credit

Last presentation 1992

This course explores the culture of the 'Age of Reason' at its height (roughly, the middle decades of the eighteenth century) through close study of a number of texts and of certain leading figures. As far as is practical, each text is presented and discussed by several authors and from the points of view of different disciplines. (For example, the units on *Tom Jones* have been written not by a literary scholar alone but also by a philosopher and by historians.) Similarly, throughout the course there is emphasis on interconnections between the 'texts' studied, whether literary, philosophical or belonging to fine arts. The course also offers guidance on the use of such concepts as 'the Enlightenment', 'Augustan', 'Classical' and 'the Rococo', and there is a general emphasis on the ideas of the time.

Content The 'texts' include three novels, *Tom Jones* by Henry Fielding, *Candide* by Voltaire and *Les Liaisons dangereuses* by Choderlos de Laclos, the two latter in English translation; *Epistle IV of Pope's An Essay on Man*; writings by the philosopher David Hume, the economist Adam Smith, and the influential writers of the French Enlightenment; chapters from Gibbon's *Decline and Fall of the Roman Empire*; documents about Frederick the Great and about Enlightenment science and its impact; paintings and engravings by Chardin, Hogarth and Joseph Wright of Derby; representative works of English architecture and landscape; orchestral works by Haydn, and Mozart's opera *The Marriage of Figaro*.

The four-week music block gives a choice, one option for students with some technical

grounding in music (such as they would have gained from A241 *Elements of music*, for instance), and the other for those with none; the texts being, in the former option, Haydn's *Sinfonia Concertante* and Symphony 104 and in the latter Mozart's *Marriage of Figaro*. Records will be provided.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites None, but the course builds upon the arts foundation course and you are encouraged to take A102 before embarking on A204.

Assessment Eight TMA's (50%), and the examination (50%). All TMA's will be assessed, and substitution can apply for up to two.

Broadcasts Sixteen television broadcasts and thirty-three radio programmes. The television broadcasts include programmes on the city of Bath (as an example of eighteenth-century town planning), paintings by Hogarth and Chardin (Gibson and the Ruins of Rome), Frederick and Voltaire at Sans-Souci, the D'Holbach circle, and Mozart's *Marriage of Figaro*. Radio programmes include talks on Tom Jones as a novel, Hogarth, political prints in the age of Hogarth, architectural pattern-books, scientific method and medical advance, Gibbon as stylist and historian, Voltaire and the Lisbon earthquake, humour in classical music, and Adam Smith and David Hume.

Students with disabilities You will be encouraged to visit certain buildings and gardens, but inability to do so should not prevent you from studying the related parts of the course. Alternative assignments are available for those with visual or aural handicaps.

Preparatory reading Four of the first five weeks of the course are devoted to the study of Fielding's *Tom Jones* and it would be to your advantage (though in no way obligatory) to read the novel before the course begins.

Set books H. Fielding *The History of Tom Jones*, Penguin. Voltaire (trans. J. Butt) *Candide*, Penguin. A. Smith *The Wealth of Nations*, Penguin. Choderlos de Laclos (ed. A. Skinner trans. R. Aldington) *Les Liaisons dangereuses*, Routledge. S. Eliot and B. Stern (eds) *The Age of Enlightenment: an Anthology of Eighteenth-century Texts*, 2 volumes, Ward Lock Educational. D. Hume *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*, ed. L. A. Selby-Bigge, Oxford University Press.

Special feature Specially prepared long-playing records are provided to accompany the units and you must have easy access to a record player.

A205 CULTURE AND BELIEF IN EUROPE 1450-1600

Second level: full credit

The course examines the nature of culture and religion in the period 1450-1600, surveying sixteenth-century debates and pursuing modern ones about the period. It is strongly interdisciplinary (not multidisciplinary) in character, and has the following aims:

- To enable you to understand issues and interpret evidence through the study of primary and secondary sources including artefacts and texts.
- To enable you to build upon interdisciplinary study skills developed from studying the arts foundation course and to complement other second-level interdisciplinary courses.
- To develop further skills appropriate to the various disciplines within the Faculty of Arts.

The course is not chronological but is constructed around four main themes and seven subsidiary topics. The four main themes are:

Religion and secularization
What hold did Christianity have upon the men and women of sixteenth-century Europe? How was it affected by the Protestant and Catholic Reformations? Did European culture and society become more secular in the sixteenth century?

Authority, political and cultural
Who had legitimate power over whom? Who or what set the standards of acceptability and excellence in sixteenth-century European culture?

Cultural and social change
How did European culture and society change in response to new developments in knowledge, learning and the location of all forms of authority — religious, political and cultural?

Regionalism and widening perspectives
What was the effect of contact between communities on either side of Europe's external and internal frontiers? What was the relationship between centre and periphery in the regions of Europe?

The seven subsidiary topics are women, popular

culture, minorities, printing, magic and witchcraft, religious reform and humanism.

Content

Block 1 Popular culture: humanism and belief 1450-1530 forms the conceptual framework for the course. Introducing discipline and interdisciplinary study skills and using contemporary texts and artefacts it looks at a mystery play, a shrine, an altarpiece, philosophy, poetry, culture and painting.

Block 2 Venice and Antwerp examines pre-Reformation society and culture through a comparative study of Venice and Antwerp, looking at politics, economics, patronage, humanism, printing, minorities.

Block 3 The Protestant and Catholic Reformations examines and explains the basic developments of the Reformation movements as parallel phenomena, studying, for example, Luther, Calvin and Melancthon, predestination and free will, Dürer and religious art in Germany. Case studies investigate the influence of the Reformation on a selection of cities in Europe.

Block 4 Reform and culture considers the connections between the Reformation, culture and society. One case study, on English culture, includes the music of Tallis and Marlowe's *Dr Faustus*. The other, on Spanish culture, includes El Greco, St Theresa and some Jesuit political philosophers.

Block 5 Europe and the wider world investigates Europe's response to the New World, Asia and Africa through writings about the New World, relations with the Muslim world, the Ottoman Empire, exchanges of medicine and art.

Block 6 Communication and culture considers elite and popular culture and the influence of printing on cultural changes. It studies both traditional non-print culture (festivals, sermons) and the use of books (*Morte d'Arthur*, *Don Quixote*).

Block 7 France (1547-1610) considers the nature of authority (secular and religious) from the reign of François I to Henri IV, seen in the context of the political tensions and wars of religion of the time, and the emergence of the nation state.

Block 8 The British Isles investigates the comparatively late effect of the Reformation in Britain, concentrating on the theme of authority through study of Shakespeare's *Richard II*, music, the Sidney Circle, Spenser's *Faerie Queene* and Scottish court poetry.

Block 9 Revising the course presents a general review of the course in preparation for the exam.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite A102.

Complementary and related courses [A201], [A202], [A203], A204.

Assessment Eight TMA's (50%) and the examination (50%). Substitution can apply to two TMA's but not to TMA 08.

Broadcasts and cassettes Twenty-four television and sixteen radio programmes; five half-hour and five one-hour audio cassettes.

Students with disabilities If you have a visual handicap you may have difficulty with the visual content of some of the blocks.

Set books *Culture and Belief in Europe 1450-1600: an Anthology of Primary Sources* has been produced for the course by D. Englander, D. Norman, R. O'Day and R. Owens (eds.), Basil Blackwell. Another text used throughout is H. Koenigsberger, G. Mosse and G. Bowler *Europe in the Sixteenth Century* (2nd edn.), Longman. Other set books are: D. Lindsay *The Thirteenth Estates* (ed. R. Lyall), Canongate. C. Marlowe *Dr Faustus: A Text* (eds. D. Ormerod and C. Wortham), University of Western Australia Press. Michel de Montaigne *Essays* (trans. J. M. Cohen), Penguin. W. Shakespeare *King Richard II* (ed. A. Gurr), Cambridge University Press. E. Spenser *The Faerie Queene Book I* (ed. Bayley), Oxford University Press.

A228

THE RELIGIOUS QUEST

Second level: half credit

Last presentation 1992

The number of places on this course will be limited to 650 in 1992

This course has the following aims:

- To explore aspects of 'the religious quest' in six of the religions of the world.
- To familiarize you with the scholarly methods needed for the objective study of religions.
- To explore the meaning of concepts and modes of expression used in different religions.
- To provide a historical framework for the religions studied.
- To give an account of the character, content and riches of the sacred literature of these religions.
- To encourage you to enter into the thought-world of others, and to study objectively, but with sympathetic interest, the meaning of their religious beliefs and practices.
- To help you to assess the influence of religious thought and practice on human life, both social and individual.

Content There are fifteen units in two blocks. The first block deals with religions of the Indian tradition: *Hinduism* (Units 1-4), *Buddhism* (Units 5-7), *Sikhism* (Units 8-9). The second block contains the study of religions of Middle Eastern origin: *Judaism* (Units 10-11), *Christianity* (Units 12-13), *Islam* (Units 14-15).

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [AD208].

Recommended prerequisites None, though it would be useful to have taken [A101] or A102.

Complementary and related courses As well as A102, related courses in the Faculties of Arts and Social Sciences and in the School of Education are [A313], [A381], [D207] and [E354].

Tuition There is no residential school but there will be local tuition, evening tutorials or day schools, depending on local conditions. Since many of the ideas and concepts encountered in this course are likely to be new and perhaps difficult to understand, attendance at local tutorials will be quite important.

Assessment Four TMA's (50%) and the examination (50%). Substitution can apply to one TMA. The TMA's cover the whole course but you will be able to choose which religions you will concentrate on in the two blocks.

Broadcasts and cassettes The six television programmes and two audio cassettes are part of the study of the six religions. The television programmes show ways of worship and religious observance in different parts of the world. Much of the material is completely original. If you cannot receive these broadcasts you will be at some disadvantage, although no part of the assessment will be based exclusively on broadcast material. Religious ritual can be very colourful and a colour television set is an advantage for some of these programmes, though not indispensable. The audio cassettes include personal views of each religion by a practitioner, and a programme on the Hindu temple.

Students with disabilities Students with visual and other handicaps have successfully studied this course.

Preparatory reading It would be useful to read the relevant sections of *The Hutchinson Encyclopedia of Living Faiths*, one of the set books, before the course begins.

Set books W. Foy (ed.) *The Religious Quest: A Reader*, Croom-Helm (course reader). R. C. Zaehner (ed.) *The Hutchinson Encyclopedia of Living Faiths*, Hutchinson (4th ed.) You will be supplied with Bowker, *Worlds of Faith*, Ariel.

A241

ELEMENTS OF MUSIC

Second level: half credit

A241 is not a musical appreciation course; it is a technical course in music theory, including harmony and analysis, designed to complement higher-level specialist music courses, especially A314 *From Baroque to Romantic: studies in tonal music* and A341 *Beethoven*. A241 gives you a grasp of harmony, style, form and orchestration which is essential for the detailed study of music at higher levels. The course is intended both for students with some musical background (playing an instrument or music studied for O level, for example) and also for those without knowledge of the technical aspects of music, but with a love of music and a desire to study it in some depth. For these there will obviously be more work to start with. There is a preparatory supplement on rudiments, and a cassette which can be studied before the first course units by those with no previous experience. However, if you are seriously

interested in taking A241 but are an absolute beginner and anxious about your suitability for the course, seek advice from your tutor-counsellor.

The general aim of the course is to familiarize you thoroughly with the elements of music, develop aural perception, teach score-reading, and give you the technical knowledge to practise harmonic and stylistic analysis of the period between about 1730 and 1900.

Content The course is in three main blocks, together with aural training, score-reading and stylistic analysis, all reinforced by practical experience of playing a recorder.

The first three-unit block deals with rudiments (elements, notation and terminology) and has exercises in 'score-reading' and aural training. If you have no previous knowledge you will find this block rather dense and full of facts to be learnt (though the specially prepared cassette and supplement should help those who need it). If you have half-forgotten experience you will have to make an effort to refresh your memory in these areas. The core of the course follows: nine units concentrating on harmony and style. You will work exercises of an elementary nature — phrases in major and minor keys, modulation, simple harmonizations and so on — and will learn to do harmonic and stylistic analysis by discussion of more advanced harmony, texture, and style. You may find that the course reaches a peak of demand by Unit 8, where you are required to do harmonization. We feel that not until you have worked exercises yourself in detail will you appreciate fully and be able to analyse thoroughly the workings of the 'masters'. After Unit 8 the course makes different demands of a more analytical and less practical nature.

Units 13-15 deal with form in a refreshing and unpedantic way. The last unit is devoted to a quick study of orchestration — mainly orchestral sonorities, examples of which have been specially written and recorded.

NOTES FOR PROSPECTIVE STUDENTS

Assessment TMA's 02-08 (50%) and the examination (50%). Substitution can apply to up to two TMA's. There is also one formative TMA (01), not used for assessment.

Listening to the cassettes is essential for the completion of the first five assignments, since aspects of aural work are part of these assignments, so you must have easy access to a cassette player. Half of the examination is devoted to a harmony question and the rest to questions on stylistic and harmonic analysis, form and orchestration.

Records and musical instruments Specially prepared long-playing records are provided to accompany the units, and you must have easy access to a record player. You can also, if you wish, be provided with a small electric reed organ to enable you to hear what you write. (This instrument may not be taken or sent outside the United Kingdom.) Correspondence tuition on playing a recorder runs for the first twelve units of the course, and you will need a recorder of one size or another. These are available at modest cost but do not buy one until you have read the advice in the Course Guide.

Broadcasts and cassettes Eight television programmes and sixteen former radio programmes on audio cassettes. On the whole these reinforce the written material. Some cassettes contain aural exercises as part of assignments (see 'Assessment'). There are three other cassettes: *Practice in aural training: Understanding what you hear*, and a revision cassette.

Students with disabilities The course is not suitable for those who are aurally disabled. If you have impaired sight you will need the help of an amanuensis or cassette recorder and must have a good ear.

Set books and cassettes E. Blom (ed.) (revised by David Cummings, 6th edn.) *The New Everyman Dictionary of Music*, J. Dent. J. Hosier *Instruments of the Orchestra*, Oxford University Press (boxed set containing book and cassette).

A282

SCIENCE, TECHNOLOGY AND EVERYDAY LIFE 1870-1950

Second level: half credit

The main aim of this course is to enable you to associate changes in people's lives at home, at work and at leisure with scientific and technological developments at the heart of what has been called the 'second industrial revolution'. How and why such developments came about is explored by considering, for instance, the roles played by government policy,

consumer demand, capitalist expansion and ideological debate. The processes of discovery, invention, innovation and diffusion are examined within their social context, involving you in debates about the extent to which science and technology have determined historical change. You are encouraged to examine critically the belief in scientific and technological 'progress' which was widespread in the chosen period. The focus is mainly on Great Britain, the USA and, to an extent, Western Europe. The course will equip you with the basic skills necessary for the study of the social history of science and technology, such as the ability to evaluate both historical evidence and theories about the development and interaction of science, technology and society.

Content The main text of the course is an anthology of thematic essays written by the course team. The areas dealt with in the essays are: electrification, materials (e.g. plastics, bulk steel), new modes of transport (e.g. electric traction and the internal combustion engine), new modes of communication (e.g. radio, cinema), food production and consumption, health and medicine and finally, applications of 'scientific method' to human problems.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites None, but familiarity with the Introduction to History in A102 may be useful.

Complementary and related courses A102, S102, T102, [A281], A317, [D102], MA290.

Assessment Four essay-type TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts There are eight television programmes which are part of the teaching. The first programme raises some of the main concerns of the course and in particular examines the technological optimism of the period and how this was affected by, for example, two world wars and large-scale economic depression. The following seven programmes each deal with a particular innovation or system of innovations such as aluminium, the electric home, the automobile and an anthology essay, and exercises are included in the Study Guide. There is one audio cassette.

Students with disabilities The course should present no special problems, although if you are visually handicapped you will have some difficulties with the broadcasts, which are an important part of the course.

Special features You are advised to record the television programmes, as they contain valuable sources of archive film, newsreels, advertisements etc. which will be useful for study in depth and future reference. Nevertheless, access to a video recorder is not essential.

Set books There are two volumes of primary and secondary source material, produced specially for the course. The primary sources reader will be supplied with the course material but you will have to buy the secondary reader, C. Chant (ed.) *Sources for the Study of Science, Technology and Everyday Life 1870-1950* Vol. 2 A Secondary Reader, Hodder and Stoughton.

A293

ROME: THE AUGUSTAN AGE

Second level: half credit

Last presentation 1992

A293 is an interdisciplinary course which introduces the main cultural, political and social features of the Roman Empire in the late first century BC and the early first century AD. No previous knowledge of the period is required.

The age of Augustus saw the establishment, out of a period of military anarchy and political chaos, of a form of government which was to preserve the Roman Empire for almost a further five hundred years. The aim of the course is to enable you to study, appreciate and evaluate a wide selection of ancient source-material (in translation) — literary, historical, philosophical, epigraphic, archaeological, architectural and artistic — which is presented in a course anthology, illustrated booklets and broadcasts.

Content The course is divided into four sections. In the first (Units 1-3) the main features of the Roman world are introduced, with emphasis on the political and social ethos of the

ruled aristocracy of the late Roman republic, and its breakdown. Study of works by the statesman and thinker Cicero and by the Epicurean philosopher Lucretius help to set the moral and intellectual background of the subsequent age.

The second and central section (Units 4-9) deals with the principate of Augustus (27BC-AD14) and his successors. The main features of Augustus' rule are highlighted by a critical study of the emperor's own account of his achievements, the *Res gestae*. Particular attention will be given to Augustan poetry (selections from Virgil, Horace and Ovid). Unit 9 looks at Augustus' successors, the emperors Tiberius, Gaius and Claudius (d. AD54), and considers to what extent they maintained or departed from an established pattern of rule.

The third section (Units 10-12) considers Rome in the wider context of its relations with Italy and the provinces. Social life, architecture and town planning are closely related in the study of such questions as occupations, social class, the relationship of town to countryside and the cultural influence of Greece on Roman life.

The course concludes with three provincial case studies. The purpose of these is to balance the main centre of the course, Rome, with some detailed insights into the relations between Roman civilization and indigenous culture in various parts of the Roman Empire. Study of Britain and Germany (associated with Northern Gaul) in the West is balanced in the East by Judea, with its old-fashioned Jewish and Hellenic culture. Among questions considered in this last section are the attitude of Rome to Judaic religion and the historic origins of Christianity.

The course units are:

- 1 From Republic to Principate (historical introduction)
- 2 Cicero, *De officiis*
- 3 Lucretius, *De rerum natura*
- 4 Augustus, *Res gestae*
- 5 Roman painting and sculpture
- 6 Augustan poetry
- 7 Tiberius, Gaius and Claudius
- 8 Social history: architecture and town planning
- 9 Provincial case studies I: Gaul, Germany and Britain
- 10-12 Provincial case studies II: Judea.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [A291].

Recommended prerequisites None, but A102 is a good introduction, particularly the units on historical sources and methods, which you are strongly advised to read if you have not taken A102.

Complementary and related courses [A292], A294.

Assessment TMAs 01-04 (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes The audio cassettes enable distinguished scholars to supplement, or sometimes differ from, points of view expressed in the main body of the course. The eight television programmes introduce the wealth of surviving visual material.

You will also receive an audio cassette which gives instruction on the use of historical sources and help with the study of texts (especially poetry) in translation. The material in this cassette is closely related to the unit texts.

Students with disabilities If you are visually handicapped you will find Unit 5 'Roman Painting and Sculpture' and the architecture section of Units 10-12, both of which depend upon use of illustrated booklets, very difficult, though where visual evidence is demanded an alternative TMA question will be provided. The ability to visit libraries is an advantage but is not essential, so if your mobility is restricted you should not have particular difficulty with the course.

Preparatory reading If you wish to do some preparatory reading we recommend: D. R. Dudley (1975) *Roman Society*, Penguin; E. T. Salmon (1977) *History of the Roman World 30BC-AD138*, Methuen; C. M. Wells (1982) *The Roman Empire*, Fontana. If you wish to investigate museums or archaeological sites look at: R. J. A. Wilson (1975) *A Guide to the Roman Remains in Britain*, Constable, and the *AA Guide to Stately Homes, Museums, Castles and Gardens*, which includes important archaeological sites.

Set books Most of the set reading and other material for study is in a course anthology, K. Chisholm and J. Fergusson (eds.) *Rome: the Augustan Age*, Oxford University Press. (The illustrated booklets are sent to you as part of the course material.) You will also need a history text, H. H. Scullard *From the Gracchi to Nero: a History of Rome*, Routledge, which serves as a reference book for chronology and events. Both the anthology and *From the Gracchi to Nero* are referred to throughout the course.

A294

FIFTH-CENTURY ATHENS: DEMOCRACY AND CITY STATE

Second level: half credit

The Athenians of the fifth century BC had an historically unique experience of direct rule within a city state, and the course explores its diverse cultural and social implications. The Athenians regarded their political activity as the chief inspiration for their social and cultural achievement and as the basis of their wider-reaching and profitable empire. For us, it is the central point in a study of the most significant and well documented period of the ancient world.

The aims of this interdisciplinary course are to introduce this aspect of classical Greece and to enable you to study, appreciate and evaluate a wide selection of ancient source material including texts (in translation), buildings and other works of art and artefacts. A variety of different sources embody the central themes of the course; in particular we consider how the nature of our source material for classical Athens affects the way in which we study the period. We also ask how our contemporary experience affects our study of the past. No previous knowledge of the subject is required.

Content The course is divided into five main blocks; in each, a text or visual source is used to introduce an important theme.

Block 1 Introduction

Block 2 The Greek theatre in its dramatic and social context There is detailed study of two important tragic dramas (Aeschylus, *Prometheus Bound* and Sophocles, *Antigone*); the material is also used to relate the Athenian dramatic festivals to their wider social and political context.

Block 3 Thucydides and Athenian democracy Thucydides was the chief historian of later fifth-century Athens, and his *History of the Peloponnesian War* is used as a basis for a study of the dynamics of political change and for a case study of historical aims and methods.

Block 4 Tensions and change in fifth-century Athens This examines the tension and change in society and its values brought about by war and empire; a wide range of evidence is drawn upon, including Athens' most famous monument, the Acropolis, as well as an 'anti-war tragedy', the *Trojan Women* of Euripides.

Block 5 Philosophy and religious experience in late fifth-century Athens This block explores the development of Greek rationalism as seen in medical, scientific writers, the Sophists and a play of Aristophanes, the Athenian comic dramatist, leading to a study of a Socratic dialogue of the philosopher Plato. The *Bacchae*, the last tragic drama of Euripides, is also read in order to examine the relationship of values based upon rational modes of thought and conventional piety to Greek mystery religion. This block draws together themes from earlier parts of the course.

Block 6 Course revision and examination preparation August and September will be free of TMA deadlines to give you a chance to consolidate your work and prepare for the examination with the help of a structured revision block.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [A292].

Recommended prerequisite A102.

Complementary and related courses This course complements A293. Also related are [A203], A204, A205 and A228.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts There are eight television programmes closely integrated with the content and teaching strategy of the course.

Cassettes Audio and audio-vision cassettes integrate teaching material with books. You must have the use of an audio cassette player.

Students with disabilities If you have a visual handicap you will find some difficulty with the study of visual evidence, but this should not make it impossible for you to tackle the course successfully.

Preparatory reading It would be useful, though it is

in no way obligatory, to read through some of the set books (these are the primary texts of the course). The Greek dramas to be studied in Block 2 (see above) would be an obvious choice.

Set books A secondary text book *The World of Athens*, Joint Association of Classical Teachers, CUP, will be sent to you as part of the course material. Primary texts (all Penguin Classics) to be purchased are: Thucydides *The Peloponnesian War*, Sophocles *The Three Theban Plays*, Aeschylus *Prometheus Bound and Other Plays*, Euripides *The Bacchae and Other Plays*, Aristophanes *Lysistrata and Other Plays*, Plato *The Last Days of Socrates*.

Note: Penguin has two editions of Sophocles; you should buy the edition translated by Robert Fagles, ISBN 0-14 044 425-4.

A310

LIFE AND DEATH

Third level: full credit

The chief aim of the course is to show how various problems of life and death, such as suicide, euthanasia and abortion, can be brought under moral theories, that is, systematic philosophical accounts of the difference between right and wrong, good and evil, justice and injustice. A complementary aim is to suggest some ways of deciding between moral theories when they conflict in their treatment of problems of life and death. By the end of the course you should be able to construct arguments for and against your own beliefs with the aid of theories. You should also be able to appreciate underlying questions about the value and meaning of life and to evaluate theories about 'self-realization' propounded by various philosophers.

The philosophical theories and arguments considered in the course are entirely secular; explicitly religious views are not discussed.

The course will help you to:

- Extract unstated moral principles from moral rhetoric.
- Test moral principles against difficult cases taken from real life.

As well as its obvious appeal to students with an interest in philosophy, those who have a background in education, sociology, politics, religion and psychology should find this course of interest. It should also be of value to people whose work in such areas as health care, policing and social work involves them in the consideration of life and death problems.

Content The course material consists of four books, each of which can be read independently of the others, and all of which are written for an audience with little or no background in philosophy. Teaching devices, such as exercises and material linking text with audio cassettes, are confined to study guides accompanying each of the four course books.

Book 1 starts by considering the difference between moral rhetoric about life and death, such as might be produced by organized lobbies or interest groups, and moral philosophy about life and death. There is a discussion of the ways in which moral theory can improve on ordinary moral rhetoric about, for example, abortion or euthanasia. Then a number of theories from moral philosophy, notably utilitarian and Kantian ones, are expounded. These theories are then applied in a detailed discussion of one particular life and death issue — the permissibility of capital punishment. Book 1 is entitled *Moral Theory and Capital Punishment*.

Book 2 widens the range of life and death issues under discussion to include questions about the permissibility of euthanasia and the moral status of suicide. Difficulties are revealed in the utilitarian treatment of these issues, suicide in particular. The book considers the possibility that special questions are raised by suicide, questions to do with the value or meaning of the life to be cut short, perhaps better accommodated by a non-utilitarian philosophy like existentialism. Utilitarianism is again shown to be under strain when applied to questions about the morality of euthanasia. The discussion draws on a number of real medical cases. This volume is entitled *Ending Lives*.

Book 3 The morality of abortion is the central topic of this book. Balanced consideration is given to liberal and conservative positions in the debate about abortion, and influential arguments supporting these positions in the philosophical literature are carefully reviewed. A novel argument is constructed broadly in keeping with a conservative position but not based on the usual premises. Book 3 also touches on issues connected with foetal research and surrogacy. It is entitled *Beginning Lives*.

Book 4 Questions about the value and the meaning of life that have arisen intermittently in the other three books are now taken up in earnest. Two themes predominate: the interpretation of facts about life that may seem to make it meaningless, such as death, the lack of a purpose of life, etc. and the ideal of self-realization. Theories of self-realization from Aristotle to Bradley and Sartre are considered. This book is entitled *The Quest for Meaning*.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite A102.

Complementary and related courses This course complements A228, [A292] and [A309], and is relevant to [D207], D211, D310, D321, [D355], [D435], U235 and U205.

Assessment TMAs 02-08 (50%) and the examination (50%). Substitution can apply to one TMA. TMA 01 is formative and not used for assessment.

Cassettes Five 90-minute audio cassettes. There are no broadcasts.

Residential school A one-week course-based summer school.

Preparatory reading The Glover set book is a good introduction to the topics dealt with in the course.

Set books There are three set books and a course reader: T. L. Beauchamp and J. F. Childress *Principles of Biomedical Ethics*, Oxford University Press (3rd edn.), J. Glover *Causing Death and Saving Lives*, Penguin, P. Singer (ed.) *Applied Ethics*, Oxford University Press, O. Hanfling (ed.) *Life and Meaning*, Basil Blackwell (course reader).

A314

FROM BAROQUE TO ROMANTIC: STUDIES IN TONAL MUSIC

Third level: full credit

The aims of the course are:

- To introduce a wide range of music from the most familiar period of European musical history, including acknowledged masterpieces of the concert repertoire.
- To place this music in its context by means of biographical, social and historical investigation and by studying a wealth of less familiar but valuable music.
- To encourage informed and critical listening to music, and to give insight into the process of composition during the period of major-minor tonality.

Content There are thirty-two units, with accompanying scores, divided into three main blocks: Baroque, Classical and Romantic. In the first two blocks introductory 'mapping' units prepare the way for detailed discussion and analysis of works by Bach, Handel, Haydn, Mozart, Beethoven and Schubert. The music of the Romantic era is approached through topics or genres rather than individual composers: Romantic piano music; merging the arts (song, symphonic poem, music drama); the symphony; nationalism. The units are as follows:

Baroque

- 1 An introduction to Baroque music
- 2 Some underlying principles of Baroque music
- 3 Baroque music in Italy
- 4 Baroque music in France and England
- 5 Baroque music in Germany

Handel

- 6 An introduction to Handel's life and works
- 7 Cannons (1717-18); *Acis and Galatea*
- 8 London (c 1740): two case studies (Grand Concerto Op. 6 No. 11 in A major, Organ Concerto Op. 4 No. 4 in F major)

Bach

- 9 An introduction to Bach's life and works
- 10 Köthen (1717-23): two case studies (Brandenburg Concerto No. 4, Cello Suite No. 1 in G)
- 11 Leipzig (c1740): three case studies (Prelude and Fugue in E, 'Kyrle' from the Mass in B minor, Canon Variations on Von Himmel hoch)

Classical

- The background to the Classical era:
11 The Classical era: an introduction

- 12 Mainly opera
- 13 Keyboard, chamber music and song
- 14 Symphony and concerto

Haydn and Mozart

- 15-16 Haydn (String Quartets Op. 1 No. 1 and Op. 76 No. 4)
- 17-18 Mozart (Piano Concerto No. 22, Symphony No. 40)

Beethoven and Schubert

- 19-20 Beethoven (Symphony No. 3 *Eroica*)
- 21-22 Schubert (Symphony No. 8 'The Unfinished', a selection of Lieder)

Romantic

Romantic music I

- 23-24 The Romantic era: an introduction
- 25-26 Romantic piano music (Brahms, Chopin, Liszt, Mendelssohn, Schumann)

Romantic music II

- 27-29 Merging the arts: song and opera (songs by Berlioz, Brahms, Fauré, Gounod, Schumann, Wolf; Donizetti *Lucia di Lammermoor*, Verdi *Aida*, Weber *Der Freischütz*, Wagner *Götterdämmerung*)

Romantic music III

- 30-31 The symphony and symphonic poem (Brahms, Symphony No. 4; Mendelssohn, Symphony No. 4 'Italian'; Tchaikovsky, Symphony No. 6; Berlioz, *Romeo and Juliet*; Liszt, *Orpheus*)
- 32a Russian nationalism (Glinka, *Kamarinskaya*; Tchaikovsky, String Quartet, Op. 22; Borodin, *In the Steppes of Central Asia*)
- 32b Tonality dissolving? (Wagner: *Tristan* (prelude); Satie, *Gymnopédie 1*, Mussorgsky, 'With Nanny'; Liszt, *La Lugubre Gondola 1*)

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite A241.

Assessment TMAs 01-08 (50%) and the examination (50%). Substitution can apply to up to two TMAs. The questions are designed to cover three basic skills: 'information gathering', musical analysis, and writing an 'argument' essay.

Cassettes Fourteen audio cassettes and thirteen discs containing the major case studies. A revision cassette to help you prepare for the examination is also included.

Residential school A one-week course-based summer school including viewing and studying opera, seminars, lectures and the opportunity of music-making for singers and instrumentalists alike. The school offers the first-class facilities of a large university music department.

Students with disabilities This course is probably impossible if you have severely impaired hearing and will present substantial difficulties for those with visual handicaps. Course and supplementary materials are not available on tape.

Special features You must have the use of a good quality cassette player with a counter and a record player.

Preparatory work The best way to prepare for A314 is to listen to as much music as possible from the period covered by the course: any of the case studies mentioned above, other works by the same composers or similar works by other composers. You will find BBC Radio 3 an invaluable source of material. *Radio Times* contains details of all its programmes. A good plan would be to select a few hours of familiar and unfamiliar music each week.

If it is several years since you did A241 *Elements of music* you will probably benefit from reminding yourself of the ground it covers: from very early on, A314 assumes reasonable fluency in following harmonic analysis and reading vocal and simple orchestral scores.

Listening and getting back into the way of looking at music are more important preparation than reading about music. A314 itself will give you a thorough historical framework as well as much detailed information. However, if you do want to do some reading you could try browsing in *The New Grove Dictionary of Music and Musicians* (1980) which is available in many libraries: (just sample, say, the entries on a few of the major composers). Alternatively, Jack Westrup *An Introduction to Musical History* (Hutchinson) outlines briefly some of the problems of music history while D. J. Gout *A History of Western Music* (Dent) is a fairly substantial and well-illustrated account into which you might like to dip selectively. (Chapters IX to XVIII cover roughly the same period as the course.)

Set materials Listed below are the works that you should buy. Versions and stockists will be suggested in the final mailing.

Scores

- Beethoven Symphony No. 3 *Eroica*
Brahms Symphony No. 4
Mozart Symphony No. 40

Discs

- Beethoven Symphony No. 3 *Eroica*
Brahms Symphony No. 4

A315

MODERN ART AND MODERNISM: MANET TO POLLOCK

Third level: full credit

Last presentation 1992

The course introduces aspects of the history of modern art, both of a range of works of art and of the prevailing theories and means of interpretation. By 'Modernism' we refer to a particular set of ideas and beliefs about modern art which has become dominant in this century. The course should enable you to demonstrate your understanding of 'Modernism' and to consider alternative explanations and interpretations of modern art using historical and critical analyses current in the history of art of other periods. The works of art discussed in detail in the course range from Manet's paintings of the 1860s to Jackson Pollock's of the 1940s and early 1950s. The earliest critical or art historical texts considered are from the 1840s, while the latest are selections from the early 1980s. Our aims are:

- To encourage an informed approach to the analysis of works of art; to demonstrate and review the methods and concerns of historians and critics of modern art; and to provide a basis for identifying and discussing the problems raised by the study of it.
- To show that 'Modernism' can be seen as a set of ideas by which the history of art is represented and its production explained.
- To encourage an understanding of the origins and history of Modernist ideas in art through a study of selected historical and critical issues.
- To examine the relations between interpretations of works of art and the social, historical and technical contexts of their production.
- To test Modernist ideas against other ways of interpreting art, with reference to information about the circumstances in which works of art have been produced.

Content Weeks 1 and 2 are devoted to study of the Course Introduction. The correspondence material for weeks 3-28 is in thirteen blocks arranged chronologically. In the last four weeks of the course you work on an extended essay.

The Course Introduction offers a general characterization of the subject of study and of its typical subjects of debate. It sets out some general concerns in modern art and art criticism, and discusses the characteristics of and approaches to Modernist ideas. It provides a point of reference throughout the course.

Most of the blocks which follow have a tripartite structure:

- Section 1 Discussion of themes and issues appropriate to the central case study.
- Section 2 Case study of a particular body of works of art in their historical context.
- Section 3 Critical section surveying changes and controversies in the interpretation of the works, artists and issues which form the basis of the case study.

The block titles are:

- I Manet and Modernism
- II Impressionism and Degas
- III Gauguin and 'Post Impressionism'
- IV Two Exhibitions: The Fauves, 1905 and die Brücke, 1906
- V Cubism: Picasso and Braque (3 units)
- VI Italian Futurism (1 unit)
- VII Abstraction and Kandinsky
- VIII Russian Art and the Revolution
- IX George Grosz and Weimar Germany
- X Léger
- XI Surrealism
- XII English Art and Modernism
- XIII Abstract Expressionism and Jackson Pollock

Each block is accompanied by reproductions in colour and in black and white, with a wide range of examples for comparative study and independent investigation. They are loose-leaf so that you can select material for use as required. The course reader is a specially prepared anthology of art criticism and theory covering the period of this course and there are frequent references to it in the teaching texts.

As you become familiar with a growing range of works of art and engage with a developing body of ideas about them, you should gain an understanding of the history of art as a history of themes, ideas and problems.

In the extended essay, the last and double length TMA of the course, you will make your own study of a work or group of works, testing the explanatory power of different types of information and interpretation, and demonstrating your ability to place your chosen subject in a relevant discussion. The broadcasts and the reader furnish examples of approaches that might be relevant.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses Experience of other third-level art history courses ([A305], [A351], [A352], [A353] and of interdisciplinary courses with art history components ([A101], [A102], [A201], [A202], [A203], [A204], [A205], [A291], [A292], [A293], [U203]) would be useful.

Assessment (i) TMAs 01-03 and 05-07 (35%); (ii) an extended essay (TMA 08) 15%; and (iii) the examination (50%). Substitution can apply to one TMA but not to the extended essay. There is a threshold of 38% on the extended essay. TMA 04 is an outline proposal for this essay and is not used for assessment.

Broadcasts Thirty-two TV and thirty-two radio-vision programmes, generally with two of each related to each block. Presenters have special interests and expertise to offer, and there is accurate and interesting film material from original works of art in a wide range of places. Colour viewing will plainly be of importance.

The broadcasts are part of the teaching: the television programmes, for instance, mostly provide examples of concerns, methods and interpretations which you will be able to review in the light of block discussion and exercises in broadcast notes.

Residential school A one-week course-based summer school in London. It is constructed around four themes which recur throughout the course: Realism, Expression and Expressionism, Abstraction, The Artist and Society.

Special emphasis is placed on visits to galleries and exhibitions which contain important works you may not otherwise be able to see. From these visits you should gain experience in making critical distinctions between characteristics of original works of art and reproductions; and develop skills in assessing interpretations in the light of evidence gained from first-hand experience of painting. Seminars provide opportunities for group discussion of issues raised in the course, and for detailed discussion of individual works. Evening sessions include optional lectures and seminars.

Students with disabilities Since one of the principal aims of the course is to enable you to make critical comparisons between works of art and texts related to them, A315 is not suitable for you if you have a serious visual handicap.

If you have impaired manual dexterity you may find some difficulty in handling the printed material, since there are frequent references in the units to the set books, the Supplementary Documents and the loose-leaf reproductions.

The extended essay will usually require trips to museums, art galleries and libraries. If you cannot do this you will be able to write an essay based on works of art reproduced in the course material.

Course and supplementary materials are not available on tape.

Preparatory work and reading The most useful preparation is to get to know galleries and museums which contain nineteenth and twentieth-century works of art and to visit national collections. It will also be worth while to look for books in your local library which contain reproductions of works of art from the period. Be sceptical of these however; you will find that the quality of reproduction varies a great deal.

There is a considerable number of general histories of modern art though there is none that we would unreservedly recommend. If you read any of these we hope that you will do so critically. Some history of the period would be very useful. We recommend *Age of Capital 1848-1875* by E. J. Hobsbawm Abacus Books, 1977, and *Europe since 1870* by James Joll, Penguin, 1976. For Block VIII Russian Art and the Revolution an acquaintance with the historical context would be especially useful. We recommend E. H. Carr's *The Russian Revolution from Lenin to Stalin 1917-1929*, Papermac, 1980.

An important concern of this course is how works of art in general are to be interpreted and explained, and how interpretations can be tested in relation to what artists actually do or have done. In this area the classic work is Ernst Gombrich's *Art and Illusion*, Phaidon, 1960 (paperback edition 1977). This is not about modern art, but it has much that is both sensible and interesting to say about art in general.

Another important concern of this course is the examination of modern art criticism. You will find a selection of relevant texts in the reader, *Modern Art and Modernism: A Critical Anthology*. Two important critics whose names recur throughout the course are Roger Fry and Clement Greenberg. Fry's collection of essays *Vision and Design* was originally published in 1920; a new edition was published in 1982 by Oxford University Press. Greenberg's

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Influential collection *Art and Culture*, originally published in 1961, has been issued in this country by Thames and Hudson. Another name you will become familiar with is Clive Bell. His *Art*, Chatto and Windus, is out of print but may be available in your library.

You will also find useful articles in art history and art criticism in the back numbers of certain specialized journals. In particular in the English journal *Studio International* from 1965-1974, and the American journal *Artforum* from 1965 onwards. If you have access to a good art library, journals worth watching for the occasional article include *Art in America*, *Art News* and the *Art Journal*, all American magazines concerned with modern art. You will also find occasional relevant articles in the English journals *Art History* and the *Burlington Magazine*. For a useful general subject index of magazine articles on art, consult the *Art Index*, which should be available in a good reference library.

We also recommend T.J. Clark's study of Courbet, *The Image of the People*, Thames and Hudson, revised edition, paperback 1982, and his *The Painter of Modern Life: Paris in the Art of Manet and his Followers* Thames and Hudson, 1985. Clark has been an influential figure in the reconsideration of the Modernist approach to art history. You might also try some of Charles Baudelaire's criticism, *Art in Paris 1845-1862* and *The Painter of Modern Life*, and other Essays, both edited and translated by J. Mayne and published by Phaidon. Many of the terms used in studying the history of modern art are complex: Raymond Williams' *Keywords: a Vocabulary of Culture and Society*, Fontana/Croom Helm, paperback, 1976 (revised edn. Flamingo/Fontana, 1983) includes a hundred or so connected essays each of which examines a 'keyword'. Many of these — aesthetic, culture, formalist, realism, etc. — are central to the course, and we strongly recommend this book.

Most of these books should be available through your local library. Naturally we do not expect you to read all of them, but we hope that this list will be helpful in planning your preliminary reading.

Set books Three set books will be used throughout the course: H.B. Chipp (1972) *Theories of Modern Art*, University of California Press; G.H. Hamilton (revised edn. 1970) *Painting and Sculpture in Europe 1880-1940* (Pelican History of Art) Viking/Penguin; F. Frascina and C. Harrison *Modern Art and Modernism: a Critical Anthology* Paul Chapman Publishing (course reader).

A317

THEMES IN BRITISH AND AMERICAN HISTORY:

A COMPARATIVE APPROACH, c1760-1970

Third level: full credit

This course provides a thematic, comparative analysis of the historical development of the two great English-speaking democracies and industrial powers. It should be of interest to both arts and social science students, as well as to those who want to specialize in history.

It teaches four basic skills:

- Organizing and presenting evidence and constructing coherent arguments.
- Making sense of documentary source material.
- Making historical comparisons.
- Understanding the debates between historians, through an intensive thematic study of economic, political and social developments in Britain and America, concentrating on three basic organizing themes: what did industrialization mean for Britain and America? What did democracy and constitutionalism mean for Britain and America? How have social differences, based on class, race and sex, developed in Britain and America?

Content These themes are studied by means of eight 'Focus Points', which concentrate on particular issues relating to the themes. The Focus Points are:

- 1 'Democracy' in Britain and America (1750-1870)
- 2 Conditions of industrialization (1750-1860)
- 3 Expansion (1763-1914)
- 4 Economic development in Britain and America (1860-1970)
- 5 Citizenship, equality and industrialization (1830-1890)
- 6 Cities and the social order (1850-1970)
- 7 Class and class conflict
- 8 The state and social reform (1890-1970)

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites A102 and either [A203], A204 or A205.

Complementary and related courses This course will provide an effective preparation for A403. If you take A317 and A403 together with A318 [A309] and A324 [A323] and one or both of the Arts Faculty multidisciplinary second-level courses (e.g. A204) you will have a most impressive 'major' in history.

Assessment Eight TMAs (50%) and the examination (50%). Substitution can apply to one TMA, but not to TMA 06.

Broadcasts and cassettes There are teaching and lecture cassettes, immediately relevant to the written course material, and eight television broadcasts. The first lecture gives a survey of the entire course. The first TV programme is an introduction to the historian's use of visual sources.

Students with disabilities The cassettes are closely integrated with the teaching material, so if you have an aural disability you would need to obtain transcripts from the Office for Students with Disabilities. You should be aware of the importance of maps, graphs and tables.

Preparatory reading You are advised to read a general history of Britain, and a general history of the United States. The following would be suitable: Eric J. Evans (1983) *The Forging of the Modern State: Early Industrial Britain 1783-1870*, Longman. Keith Robbins (1983) *The Eclipse of a Great Power: Modern Britain 1870-1975*, Longman. Carl N. Degler *Out of Our Past: The Forces That Shaped Modern America*, Harper and Row (3rd edn.).

Set books There is one set book, the course reader, C. Emsley (ed.) (1984) *Essays in Comparative History: Economy, Politics and Society in Britain and America, 1850-1920*, Open University Press. Background reading will be recommended at various points in the course.

A318

WAR, PEACE AND SOCIAL CHANGE: EUROPE 1900-1955

Third level: full credit

The aims of the course are to enable you to:

- Argue in an informed way over the nature, extent and causes of social change in the main European countries.
- Discuss the causes of the two world wars, evaluating 'structural' (i.e. economic and industrial) forces against those of geopolitics, ideology, nationalism and contingency.
- Understand the nature of total war, the differences between wars and the relationship between war and revolution.
- Argue in an informed way about the causes of social change; in particular, evaluate the significance of the total wars with respect to this change, and discuss the relationship of the wars to the main geopolitical changes.
- Develop further the skills of critical analysis and interpretation of primary source materials (documents, literary and artistic materials, film and manifestations of popular culture).
- Understand some of the different approaches to historical study, such as Marxist, sociological, linguistic, 'liberal humanist', quantitative and qualitative.
- Develop the skills of dealing with problems such as periodization and historical semantics, and writing essays of honours standard.
- Further your understanding of the nature of historiographical controversy and arrive at informed judgements on debates presented in the course.

Content

Book 1 Europe on the eve of war Introduction to the issues of the course; European armies, governments and societies in 1914; industrialized and *ancien régime* societies; social structure and high and popular culture; the processes of change; the origins of World War I.

Book 2 World War I and its consequences The nature of the war; the debate over the effects and consequences of World War I; the Russian and German revolutions and the collapse of the Hapsburg Empire: a comparative study.

Book 3 Between two wars Social developments in the western democracies; three totalitarian regimes: a comparative study; mass society; the origins of World War II.

Book 4 World War II and its consequences The nature of the war; the debate over the effects and consequences of World War II; Europe divided; social developments c. 1948-1955.

Book 5 War and change in twentieth-century

Europe The nature and causes of war; the processes of change; the results of total war.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [A301], [A309].

Recommended prerequisites None, but we strongly advise you not to attempt this course without any credits at foundation or second level in arts or social sciences.

Complementary and related courses A317, A324. A318 is an appropriate preparation for fourth-level project-based courses or for guided study courses where you engage in specialized and independent study.

Assessment TMAs 01-05 and 08 (38%); TMAs 06-07 (extended essay) (12%); examination (50%). Substitution can apply to one TMA from TMAs 01-04 but not to TMAs 05-08.

Cassettes Two returnable video cassettes of archive film compilations and four audio cassettes.

Residential school A one-week course-based summer school. The school is an essential element in giving you an introduction to history at third level. Development of effective skills in discussion and analysis, handling of primary sources and writing history benefit from summer school experience, as does the appreciation of special types of source material such as film.

Students with disabilities If you have a visual or aural handicap you should note that the video and audio cassettes contain material which is integrated with the text and will be used for assessment. Film material will also be part of the residential school programme.

Preparatory reading You may find it useful to read through J. M. Roberts *Europe 1880-1945* (see below), but this is not necessary.

Set books J. M. Roberts *Europe 1880-1945* (second edition) Longman. Course reader: C. Emsley, A. Marwick and W. Simpson, (eds.) *War, Peace and Social Change in Twentieth-century Europe*, Open University Press.

A319

LITERATURE IN THE MODERN WORLD

Third level: full credit

The main aims of the course are:

- To provide you with a range of challenging and substantial primary texts (novels, poems, plays) from writing between c.1920 and c. 1980.
- To enable you to reach an understanding, appropriate to a third-level single-discipline course, of the main concepts and procedures required by the study of literature.
- To examine in relation to appropriate texts aspects of the literary-cultural change through which the subject of 'English literature' has become 'literatures in English'.
- To develop awareness of the relation of literary texts to their cultural context.
- To examine, both generally and in relation to individual texts, the relevance of literary study in the modern world.

Content The course is divided into eight main blocks and three anthologies.

Block 1 Introduction illustrates the main themes of the course with reference to shortish texts (stories, poems, plays) and excerpts from critical writing on the theoretical and subject themes and gives you initial practice in the formal analysis of such texts.

Block 2 The impact of Modernism surveys and illustrates the main features of Modernist writing in English, and related theoretical questions about literary language and narrative structure.

Block 3 'Englishness' shows how inherited definitions of 'Englishness' were challenged from about 1930 by cultural influences (Modernism) and political events, domestic and European.

Block 4 Literature and ideology surveys definitions of 'ideology' in literary and dramatic texts and the view that 'literature' as a concept is 'ideological'.

Block 5 End of empire considers the effects of end of empire on some British writers, and discusses related theoretical problems (cultural contexts, the influence of 'history' on 'literature').

Block 6 New writings in English illustrates the range of writing in English from countries formerly in the British Empire, and discusses their role in redefining 'English literature'.

Block 7 Language and gender considers gender stereotyping in literary texts, the influence of 'patriarchal ideology' on women writers, and claims for an *écriture féminine*.

Block 8 Literature and history considers the relationship between literary or dramatic texts and historical events, and how far such texts offer special insights into such events.

Anthologies The three anthologies cover drama, prose and poetry.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites You are strongly advised to take A102, A204 and A205 before A319, and to take A319 before A361.

Complementary and related courses Chronologically this course follows on from [A312] (A319 and [A312] are not an excluded combination) which it is replacing. Students of [A306] will also find much of interest in A319.

Assessment Eight TMAs (50%) and the examination (50%). Substitution can apply to up to two TMAs.

Broadcasts and cassettes Sixteen television and sixteen radio programmes; two of the television programmes will be 90-minute drama performances. Six 60-minute audio cassettes.

Residential school A one-week course-based summer school.

Students with disabilities If you have reduced manual dexterity or a visual handicap you may have difficulty with the large amount of printed material you will need to study.

Preparatory reading It would be helpful to start reading the set texts before the course begins.

Set books There will be a course reader and the following texts: Virginia Woolf *Mrs Dalloway* (Griffiths), T. S. Eliot *The Waste Land* (Faber), Graham Greene *England Made Me* (Penguin), Evelyn Waugh *Officers and Gentlemen* (Penguin), Albert Camus *The Outsider* (Penguin), Muriel Spark *The Prime of Miss Jean Brodie* (Penguin), E. M. Forster *A Passage to India* (Penguin, ISBN 0-14-018076-1), Chinua Achebe *Things Fall Apart* (Heinemann), Wole Soyinka *Madmen and Specialists* (Methuen), (ISBN 0-416-18760-9), V.S. Naipaul *In a Free State* (Penguin), R. K. Narayan *The Painter of Signs* (Penguin), D. H. Lawrence *The Virgin and the Gypsy* (Penguin), Toni Morrison *Song of Solomon* (Pan), J.G. Ballard *Empire of the Sun* (Granada), Bertolt Brecht *Mother Courage* (Methuen).

A324

LIBERATION AND RECONSTRUCTION: POLITICS, CULTURE AND SOCIETY IN FRANCE AND ITALY, 1943-1954

Third level: half credit

Liberation from Nazi occupation and Fascism at the end of World War II was not simply a military phenomenon. In France and Italy, as well as in other European countries, it also represented a profound desire for significant political, social and economic transformation. The purpose of this course is to examine the objectives of those involved in the resistance against Nazism and Fascism and to see how far they were realized in the post-war decade.

This will be done through a study not only of the politics and economics of the period, but also of its culture. Writers, artists and (in Italy) filmmakers were deeply involved in the struggle for a new society, and the course will place their work in its full context. The course is, therefore, firmly interdisciplinary in nature.

By the end of the course you should have an understanding of the forces shaping the development of post-war France and Italy, and a deeper appreciation of the relationship between art and politics.

Content The course is divided into sixteen units. Unit 1 introduces the contents and approach of the course through the study of the early works of the Italian novelist and short-story writer Italo Calvino. Unit 2 looks at economic and political reconstruction in France and Italy between 1943 and 1948. Unit 3 concentrates in more detail upon the role of the Left in both countries during the same period, while Units 4 and 12 examine the effect of the Cold War upon

intellectuals, looking particularly at two Frenchmen — Jean-Paul Sartre and Albert Camus — whose work took increasingly divergent lines and who will be studied through texts by both authors.

Units 5 and 6 look at two powerful influences which, while not totally opposed to change, were anxious that it should not be revolutionary: the Roman Catholic Church and the United States of America. Unit 7 examines the relationship between the visual arts and politics in France. Units 8 and 9 deal with Italian neo-realist cinema, which achieved widespread international critical acclaim in the post-war period. At the centre of this part of the course will be a close study of Vittorio de Sica's 1951 classic *Umberto D.*, which will be taught through video cassette.

Unit 10 explores social and economic development in France and Italy between 1949 and 1954, while Unit 11 looks at the development of the Left in the same period.

In Unit 13 the course looks at the status of women in post-war France and Italy, assessing how far they participated in and benefited from the process of liberation. Through a study of Cesare Pavese's novel *The Moon and the Bonfires*, Unit 14 ties together many of the themes of the course (anti-fascism, resistance, the Church, the influence of the United States) while at the same time leaving you with the question facing both Italy and France in the early 1950s: how to find the real source of social and political regeneration after the disappointing results of the immediate post-war period. Unit 15 examines the extent to which French and Italian culture were 'Americanized' in this period. Unit 16 is a recapitulation and revision unit.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [A203], A204, A293 or A294. As an interdisciplinary third-level course, A324 would be particularly appropriately studied after second-level interdisciplinary courses in the arts or the social sciences.

Complementary and related courses The course will complement and extend [A309] and A318. It will be a valuable basis for the interdisciplinary project work of A403.

Assessment Four TMAs (50%) and the examination. Substitution can apply to one TMA.

Cassettes Video and audio cassettes are a substantial part of the course. The video material includes one complete film, extracts from several others and a collection of documentary sources. The audio cassettes include recordings of extracts from set play texts and commentaries by outside experts on various aspects of the course.

Students with disabilities If you have a visual handicap you are likely to have considerable difficulty, particularly with those units concerned with film and art history but also, because of the importance of the other video cassettes, throughout the rest of the course. The audio cassettes will also present problems if you have hearing difficulties but transcripts are available.

Preparatory reading No special preparatory work is specified for this course, although you may wish to read one or more of the set books in advance.

Set books Jean-Paul Sartre *Crime passionnel*, Methuen. Italo Calvino *Adam, One Afternoon*, Pan Books. Cesare Pavese *The Moon and the Bonfires*, Sceptre.

A331 RELIGION IN VICTORIAN BRITAIN

Third level: half credit

This course introduces central issues in the history of religion in Victorian Britain and enables you to assess the historical evidence as it relates to contemporary scholarly debates. The course shows the complexity of the religious life of the period and the shallowness of many conventional generalizations on the subject concerning, for example 'an age of faith' or 'a crisis of faith'. It also shows how much the varieties of religious life changed during the Victorian period.

Content The content and teaching strategy of the course are based on a series of questions. In the first half of the course these are:

- What were the principal religious and anti-religious groups in Victorian Britain?
- How were these groups organized, and in what ways did their organization change during the Victorian period?

- What were their characteristic beliefs, and how did these beliefs develop and change in scope and content during the Victorian period?
- What were their internal differences and varieties of opinion and attitude?

In discussing these questions, however, more complex issues are identified. These will become the core questions of the second half of the course:

- To what extent were relationships between religious traditions in Victorian Britain dominated by the conflict between establishment and dissent?
- How far were Victorian religious conflicts matters of institutional rivalry and how far were they matters of theology, belief and morality?
- What was the relative importance of science, historical criticism, moral doubts about Christian orthodoxy, and class, in challenging traditional Christian belief in Victorian Britain?
- To what extent were intellectual, administrative and ecclesiastical developments within and between Victorian religious traditions implicitly or explicitly a response to growing secularization?
- How far were Victorian religious traditions prepared to accommodate secular influences and how far were they opposed to them?

The course material consists of four books: two volumes of essays written by the course team, one reader of primary sources and one reader of secondary sources. Four Study Guides guide you through the course material, identifying core questions and setting exercises. A detailed Glossary and Fact Sheet gives essential background information such as brief definitions of terms, and an indication of the relationships between different developments and events.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites, complementary and related courses There are no prerequisites but it is likely that most students will have studied [A101] or A102 and/or [D102] or D103, and although not necessary, it is desirable that you should have studied [A203] or A204. This course should appeal to students with a particular interest in historical studies or nineteenth-century studies, as well as in religious studies.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes You will receive four one-hour audio cassettes to supplement the teaching in the Study Guides.

Set books J. Moore (ed.) *Religion in Victorian Britain*, Vol. III, Sources, Manchester University Press. G. Parsons (ed.) *Religion in Victorian Britain*, Vol. IV, Interpretations, Manchester University Press (course readers).

A341 BEETHOVEN

Third level: half credit

This course should be of interest to those who have enough technical musical knowledge to be able to study music courses at third level. In contrast to the broad survey undertaken in A314, A341 concentrates almost exclusively on the music and life of one composer, Beethoven, and so provides an opportunity to consider in depth some aspects of Beethoven's magnificent contribution to our musical heritage.

The course introduces several of the issues, aesthetic, historical, political and social, that are central to discussion of Beethoven's music and the musical life of his time, so that you will be able to:

- Evaluate the historical significance of Beethoven's music, including its legacy in the nineteenth and twentieth centuries.
- Assess how far Beethoven's music reflects his times and how far he himself shaped contemporary musical thought.
- Identify the changing social role of the musician as brought about by Beethoven.
- Discuss the characteristics of the different musical periods of Beethoven's career.
- Demonstrate through analysis how Beethoven's music is constructed.

Content The course is divided into five main sections. The first, Unit 1, is a short biography of Beethoven which can be read as an introduction to the course and can also be used for reference as the course progresses. This is followed by four blocks.

Block 1 Beethoven the performer After Unit 2, which gives an outline of musical life in Vienna

during the 1790s, Units 3-4 deal with Beethoven's earlier piano works. Beethoven first made his reputation as a performer rather than as a composer: during the late 1790s he was considered one of the greatest pianists of his time. Many of his early compositions feature the piano, and his treatment of this medium is illustrated through a detailed discussion of his Piano Sonata Op. 13, the *Pathétique*.

Block 2 Beethoven: Classic and Romantic Although Beethoven began as a composer in the Classical tradition of Haydn and Mozart, he subsequently introduced many Romantic features into his music. These Classical and Romantic traits are considered in Units 5 and 6 respectively, in preparation for a more detailed examination in Units 7-8 of the mixture of Classical and Romantic elements in the case study for this block, the Sixth Symphony, the *Pastoral*.

Block 3 Beethoven: the brotherhood of man Beethoven was influenced by the ideas of the French Revolution of 1789 and by the events of the Napoleonic Wars. His enthusiasm for the ideal of the brotherhood of man is made explicit in the Ninth Symphony, the *Choral*, and his only opera *Fidelio* is about the rescue of its hero from wrongful imprisonment for a political crime. Both these works are treated in detail: *Fidelio* (Act II) in Unit 9-10 and the *Choral* Symphony in Units 11-12.

Block 4 Beethoven: genius and visionary Unit 13 is a discussion of the changing role of the composer and the part Beethoven played in this development, followed by an examination in Units 14-15 of one of Beethoven's late works, the String Quartet Op. 131, which is the major case study for this block. Finally, in Unit 16 Beethoven's legacy is traced primarily through his influence on Wagner, Brahms, Bartók and Tippett.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites A241. You are strongly advised to take A314 before A341. The central block of A314 deals with the Classical period in music and so forms a useful context for the more detailed discussion of Beethoven's music in A341. Units 19-20 of A314 are a commentary on Beethoven's Third Symphony, the *Eroica*.

Complementary and related courses A341 has been designed to complement A314 and therefore makes similar demands on the student. Other related courses are A102, A204 and A241.

Assessment TMAs 01-04 (50%) and the examination (50%). Substitution can apply to one TMA. Each TMA is in two parts, a mini-analysis followed by a short essay.

Cassettes Three of the seven audio cassettes contain the main works by Beethoven studied in the course. Four are teaching cassettes, of which one gives help with analysis and one provides additional musical illustrations. You will need an audio-cassette player.

Students with disabilities This course is not suitable if you have severely impaired hearing. Visually handicapped students will have difficulty in obtaining some of the scores in Braille.

Preparatory work Rather than read about Beethoven, the best way to prepare for A341 is to listen as much as possible to his music. You could begin by making yourself familiar with the five major case studies mentioned above. Then, if time permits, you could go on to the minor case studies, which are treated in less detail in the units. These include Beethoven's Second Piano Concerto, the Septet, the overture to *Egmont*, the Choral Fantasia, the String Quartet Op. 59 No. 1 and the Piano Sonata Op. 111. Many, if not all, of these works are broadcast regularly on Radio 3 — you can find details of performances from the *Radio Times* — and appear fairly frequently in concert performances. Rather than tackle too much unfamiliar music at the outset, however, it is better to listen a few times to selected works until you are familiar with them before trying further new works. Otherwise musical indigestion may set in.

If you are really intent on reading something about Beethoven before you start the course, a good introduction can be found in the article on Beethoven in the *New Grove Dictionary of Music and Musicians* (1980) which has been revised, updated and published separately as *The New Grove Beethoven* by Joseph Kerman and Alan Tyson (Macmillan, 1983). This provides both biographical material and a concise commentary on the music. For a more extended biography, Maynard Solomon's *Beethoven* (Granada, 1978) is worth while. However, much of the information in both these sources has been taken into the course material, so if you prepare yourself by listening rather than reading nothing will have been lost.

Set materials

Scores Beethoven Symphony No. 9, the *Choral*. Beethoven Symphony No. 6, the *Pastoral*.

Recordings Beethoven Symphony No. 9, the *Choral*.

A353

ART IN FIFTEENTH-CENTURY ITALY

Third level: half credit

The course selects objects and themes for study which will introduce the salient characteristics of the art of the period and allow you to practise and test the methods and debates of art history.

You will gain an insight into the circumstances of production of works of art (artists' training, varieties of patronage), and learn how to evaluate their content and function as well as how to analyse their formal properties. By the end of the course you will also have become familiar with the language of art history, and have the conceptual tools with which to investigate and assess the historical significance of a given work of art and its status as a primary source.

Content

Block I Introduction and case studies Introduction to important issues of art historical study, with particular reference to Renaissance art.

- Sculpture case study: Verrocchio's Colleoni Monument.
- Painting case study: Leonardo's *Last Supper*.
- Architecture case study: The Pazzi Chapel.

Block II The New Style in Tuscan and Florentine art, its theoretical codification in Alberti's *On Painting*, and its reception and propagation by Florentines. There is a discussion of artistic patronage and of works by Masaccio, Brunelleschi, Donatello and Ghiberti.

Block III moves out of Florence and discusses three peripatetic artists: it assesses the role in their *oeuvre* of artistic autonomy versus local expectations, and the competing attractions of the International Gothic Style and the Tuscan New Style. There is also a study of architecture in Northern Italy.

Block IV looks at a significant art form of the Renaissance, the altarpiece. There is also a case study of two fresco cycles with mythological themes, one in Ferrara, one in Rimini. These reflect the regional theme of the course.

Block V A revision block, looking at issues raised throughout the course but through new case studies on Venice, Rome and late Medicean Florence.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites None, though the course would link naturally to a programme of study which might include A102, [A203], A204, A205, [A292], A293 and A294. The course would be of interest to students of history and its visual aspects. It should not be seen as a course in art appreciation.

Assessment Four TMAs (50%), and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes There are twelve television programmes which are essential viewing. They consider and reflect the three main visual arts in the course and look at artists' techniques and at important sites, as much for their diversity as for their similarity. Courty and religious patronage and town planning are also important television themes. There is an audio cassette to teach the reading of architectural plans and Alberti's theories of perspective (in conjunction with a small kit, see 'Special features' below).

Students with disabilities If you have impaired sight you may well have difficulties with certain aspects of this course, as it requires careful study of many illustrations and critical viewing of television programmes. You should seek guidance from the Office for Students with Disabilities before conditionally registering.

Special features Any chance you have to visit local art galleries will be valuable though not essential. There is a non-returnable perspective kit, which you will assemble at home. It consists of a small cardboard box through which experiments demonstrating Alberti's perspective theories can be performed.

Set books M. Baxandall *Painting and Experience in Fifteenth-Century Italy*, Oxford University Press (2nd edn.), C. Avery *Florentine Renaissance Sculpture*, John Murray; P. Murray *The Architecture of the Italian Renaissance*, Thames and Hudson; G. Vasari (trans. G. Bull) *The Lives of the Artists* Vol. 1, Penguin; L. B. Alberti (trans. J. R. Spencer) *On Painting*, Yale University Press. You will be expected to read Baxandall at the very beginning of the course. There will be two reading weeks for you to work through a study guide of Baxandall. There is also a document collection of primary and secondary source material.

A361

SHAKESPEARE

Third level: half credit

You will be expected to learn to recognize and discuss competently the characteristic qualities of Shakespearean drama, and to be able to evaluate the effects of Shakespeare's language. The plays are studied not simply as 'poetry' or 'literature' but as 'dramatic literature' which needs some kind of staging if its qualities are to be fully realized, so television is a very important part of the course. Although we do not expect you to study other plays of the period, or much contemporary history in detail, the course material is written with appropriate attention to the artistic and social circumstances which influenced Shakespeare's thinking and stagecraft.

Although the level is appropriate to students concentrating on literature, the course is designed so that (after some recommended preliminary study) it can be taken by those concentrating on other areas — even outside arts.

Content The eight plays to be studied are: *Henry IV Parts 1 and 2; Antony and Cleopatra; Twelfth Night; Hamlet; Measure for Measure; King Lear; The Tempest.*

Of these, *Antony and Cleopatra* and *King Lear* are the texts studied in most detail — three weeks each. A summary after *Antony and Cleopatra* consolidates work on the first three plays and prepares for more advanced work on the plays that follow.

Shakespeare's language is his glory and — for modern students — his chief problem. This course has accordingly been designed to give continual guidance in this area. The plays are studied not simply as poetry but as texts intended for staging, and the television and radio programmes continually explore the process by which a text achieves life on the stage or in some comparable modern medium. Workshops and rehearsals, discussion with directors, designers and actors explore such problems as how a producer makes critical choices about how to emphasize themes, how actors make 'difficult' language accessible to a modern audience, how to identify the signals in the text which influence the staging. One of the aims of the course is to make its students into an informed audience who, for any future production, will have a special understanding of what happens before a play begins its public performance.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites A102 and [A203] or A204. Alternatively, you should have some preliminary experience in the study of literature (not necessarily of drama). The wholly inexperienced student could profitably read Units 7-8 of [A101], 'Reading poetry', and/or any second-level arts course(s).

Assessment TMAs 01-04 (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Twelve television and eight radio programmes. A colour television is desirable. There are also seven one-hour cassettes.

Students with disabilities If you have a visual or aural handicap you will find some broadcasting elements of the course difficult, but not impossible.

Set books *Henry IV Part 1* ed. P. H. Davison, New Penguin Shakespeare. *Henry IV Part 2* ed. P. H. Davison, Signet Classic Shakespeare. *Antony and Cleopatra* ed. B. Everett, Signet (new revised edition). *Twelfth Night* ed. M. M. Mahood, New Penguin Shakespeare. *Hamlet* (ed.) T. J. B. Spencer, New Penguin Shakespeare. *Measure for Measure* ed. J. M. Nosworthy, New Penguin Shakespeare. *King Lear* ed. G. K. Hunter, New Penguin Shakespeare. *The Tempest* ed. F. Kermode, Arden Paperback.

A403

ARTS AND SOCIETY IN BRITAIN SINCE THE THIRTIES

Fourth level: full credit

Last presentation 1992

Only 100 students can be accepted for A403 in 1992 and you should pay particular attention to the Notes for Prospective Students below.

This course is a culmination of studies in the Faculty of Arts and, building on previous single-discipline and multidisciplinary work, offers you the opportunity to conduct a research project related to the main issues of the course. The project can be confined to one discipline, or can cover several disciplines. The issues discussed in Essays at the beginning of the course are:

Block I Society

- 1 (a) The Thirties
- 2 World War II
- 3 Post-war era
- 4 The cultural revolution of the late Fifties and Sixties
- 5 The Seventies
- 6 Technology and society
- 7 Decline of empire
- 8 The political system
- 9 American influences on popular culture: I, II and III
- 10 The welfare state
- 11 Social groups
- 12 Standards of living

Block II Arts

- 1 The state and the arts
- 2 English art since 1930
- 3 The artist and society: the role of the composer
- 4 The artist and society: the role of the writer
- 5 Englishness and foreign influences 1930-80
- 6 The construction of taste
- 7 War, politics and the arts
- 8 The thirties legacy and post-war reconstruction in architecture

Block III Ideas

- 1 Philosophy, metaphysics and meaning
- 2 Science and belief
- 3 Mind, body and machine
- 4 Language and literature
- 5 Thinking about the arts
- 6 Morality and ethics
- 7 Political thought and ideological debate
- 8 Philosophy of religion
- 9 Developments in religion

During the first nine weeks of the course you will work through the Essays, provisionally decide upon a project related to one or more of the main issues raised, and write two TMAs covering some of these. You will then embark on your research project and submit two progress reports before finally writing a 10,000-word dissertation. There is an examination designed to show that the detail of the project can be related to the context of the course.

A list of possible projects will be provided but, in consultation with your tutor, you are expected to establish a suitable topic for yourself, bearing in mind (a) that it should relate to one or more of the 'major issues' and (b) the availability of suitable source material.

NOTES FOR PROSPECTIVE STUDENTS

Before conditionally registering for A403 you must either already have obtained credits entitling you to the award of the BA degree, or be studying a course or courses success in which would entitle you to the award of the BA degree. If you do not then pass the course(s) required for a BA degree you will not be offered a place on A403. You must not have exceeded the honours credit maximum or be put in a position to do so by studying A403 in 1992.

Students will be accepted according to date of final registration: e.g. those who finally registered in 1980 will be accepted before those who did so in 1981.

Recommended prerequisites You are strongly advised to have gained as part of your degree either two full-credit equivalents in arts third- or fourth-level courses or [D301] plus one full-credit equivalent in arts at third or fourth level. You must remember that you will be expected not only to work initially in a wide range of arts disciplines but also to undertake independent research on an arts project of your choice. If you have not got these recommended prerequisites you are strongly advised to consult the staff tutor responsible for A403 in your region before registering for the course.

Assessment TMA 01 (10%) with a threshold of 20%; TMA 02 (10%) with a threshold of 20%; Assessed Project Report TMA 03 (5%); Project Report TMA 04 (unassessed); Project TMA 05 (35%) with a threshold of 40%; examination (40%) with a threshold of 40%.

If you fail to meet a threshold your record will be given individual consideration at the award meeting but a credit will not normally be awarded without further investigation into your mastery of the course by the Examination and Assessment Board. There will be no substitution.

Tuition For the first eleven weeks of the course you will work with a generalist tutor. Then, on the basis of the project topic, you will be reallocated to a project tutor and will no longer work with your generalist tutor. You will continue to work under the guidance of your project tutor for the rest of the course. Throughout the

course you will be in touch with your tutor mainly by telephone and letter.

Students with disabilities If you are either visually handicapped or you have severe restrictions of mobility you will have difficulty with this course because all students will be required to undertake a considerable amount of independent research using material unlikely to be typed or in Braille form and requiring access to libraries, museums, art galleries, record offices. Course and supplementary materials are not available on tape.

Preparatory reading For a general historical survey of the period we recommend J. Stevenson (1983) *Britain 1914-45*, Penguin, and A. Marwick (1982) *British Society since 1945*, Penguin.

A more detailed preliminary reading list covering individual disciplines is given in the Course Guide which will be mailed in November before the course begins.

AA301

PHILOSOPHY OF THE ARTS

Third level: full credit

This is a course about the philosophy of the 'creative arts', such as music, painting, poetry and drama, and examples will be drawn from these and other arts as appropriate. You need no special knowledge or expertise in the arts in order to take this course.

The main aims of the course are:

- To introduce fundamental problems in the philosophy of the arts: the nature of works of art, the appreciation and evaluation of them, and their function at both the personal and social levels.
- To equip you with the skills you need for a philosophical understanding of these problems, and for discussion of them in a philosophical way.
- To acquaint you with contributions made to this subject by great thinkers of the past as well as the recent literature, including such writers as Plato, Aristotle, Hume, Kant, Schopenhauer, Tolstoy, Collingwood, Wittgenstein, Gombrich and Derrida.

Content

1 What is art? The first part of the course will look at the history of the concept and recent attempts to define it. If no definitions can be found, are there any limits to what may count as a work of art? This is followed by an examination of the concepts of beauty, form and other aesthetic qualities. The last section deals with the 'ontology' (mode of existence) of art. For example, does a musical composition exist in the form of a manuscript, a set of performances or something else? What are the problems of 'authentic' performance of old music? How should we evaluate fakes and forgeries of paintings?

2 Art and feeling Some thinkers have defined art in terms of a special 'aesthetic experience' or 'aesthetic attitude' on the part of the listener/viewer/reader. Can such an experience or attitude be described or defined? According to another influential theory, art is essentially an expression of the emotional state of its creator. Should music, in particular, be regarded as a kind of 'language of the emotions'?

3 Art, truth and society Does art 'imitate nature'? How would this apply to the different arts? Can we appeal to an 'innocent eye' to set the standard for visual arts? Can literature give moral insights into the human condition? Are sex and violence justified on television if that is how things really are? What is or should be the function of art in society? What are the justifications for subsidizing some art with public money while preventing other art, for example pornography, by censorship?

4 Interpretation and evaluation Are there any general criteria for the evaluation of works of art and, if not, is it purely a matter of personal taste, beyond the scope of reason? Should works of art be interpreted and evaluated solely by reference to what is there in the work? Or is it up to the author to decide what the work means? Continental aesthetics: structuralism, post-structuralism and Marxism. Differences between French and Anglo-American aesthetics, with Saussurian linguistics as a common starting point. The Marxist tradition, both Western and Soviet. Is it justifiable to treat aesthetics as a subdivision of politics?

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite A102.

Complementary and related courses A310, [A311], A319, A403.

Assessment TMAs 01-08 (50%) and the examination (50%). Substitution can apply to up to two TMAs.

Cassettes Five 1½-hour audio cassettes

Residential school A one-week course-based summer school.

Set books There are two course readers, one of which will be provided as part of the course material.

AS283

THE RISE OF SCIENTIFIC EUROPE 1500-1800

Second level: half credit

This course has been designed to interest students from all types of background. Its aim is to tackle a fundamental problem of the modern world: why did modern science develop only in Europe? And why in some parts of Europe rather than in others? It is well established that Europe experienced a scientific revolution in the seventeenth century but the wider questions of why this happened, when, and where it did, have generally been swept under the carpet. You will have an opportunity to look at these questions.

You do not need a knowledge of science: the 'S' in the course code simply means that we believe it will also be of interest to students taking science courses. Similarly, the 'A' in the title indicates that those who follow arts courses will find this course complementary to their studies and will have no difficulty in coping with the material. Any technicalities will be fully explained.

Comparison and contrast are important features of the course. There are some comparisons between Europe, China and the lands of Islam, to consider what was common and what was peculiar in the prevailing conditions in these very different societies, and to judge whether this led to differences in scientific development. However, most of the course investigates similarities and differences among the countries of Europe.

After a broad introductory survey of Chinese science, the course concentrates on Copernicus in Poland and the spread of his challenging astronomical theory through Europe; on the conditions in Italy which stimulated Galileo's work and also led to his arrest and trial by the Inquisition; the distinctive environment of Portuguese and Spanish science at this time; the developments in the German states; the surge of French science and the explosion of seventeenth-century English science; the reasons for the spread of Newtonianism; and the Scottish enlightenment. We also look at the peripheral zones rarely discussed in this context: Sweden, Russia and the Balkans. Finally, conclusions based on these analytical studies are drawn.

Teaching is through a course book of sixteen chapters and a closely associated study guide. This is supplemented by two readers, one of contemporary documents, the other a collection of interpretative essays by historians. The second of these is the only text you will be asked to buy.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Although there are no formal prerequisites, either A102, S102 or T102 would be a good approach to the course. If you have studied A204 or A205 you should find that they complement AS283. If you have been studying mainly scientific courses, you should also find AS283 a very useful course.

Excluded combination [AMST283].

Assessment Four essay-type TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Eight television programmes provide evocative visual evidence for important centres of scientific development in various European settings. Two audio cassettes explain aspects of some of the more difficult material.

SOCIAL SCIENCES

OVERVIEW

The Social Sciences Faculty offers courses that are of interest to people who want to understand how their own society works, and courses that make up more specialized programmes of study in the social sciences. You may choose to base your studies upon a core of one or two social science disciplines (economics, geography, government and politics, psychology, social policy, sociology) or to select courses to help you pursue or enter a career; or you may simply put together courses in areas that interest you. Many of the courses are directly relevant to professional demands not only as the cores of appropriate degree profiles but also for keeping up to date and developing your skills.

You may feel overwhelmed by the number and variety of courses and find it difficult to chart a path through them. Clearly you need to look carefully at the individual course descriptions and to consider how they complement each other and relate to your own requirements and interests. But some general guidance is possible. There is a straightforward educational logic underlying the whole range of courses: you should be able to develop your skills and experience as you work from foundation level through to third (and fourth) levels. Just as the foundation course prepares you for the second level, so the completion of two or three second-level courses is preparation for work at third level.

The foundation course D103 *Society and social science* provides a grounding in the principal debates and approaches of the social sciences, and is a helpful introduction to the ways of learning within the Open University and the social sciences in particular. It is an important first step for those embarking on distance education, even if they have experience of other forms of learning. But it is not a dry introductory course. It starts from questions that concern us all, bringing together insights from different disciplines to help you better understand our very diverse society. As well as examining the United Kingdom in the 1990s it looks at the historical and international contexts of this society and considers how these affect our everyday lives.

The Faculty's second-level courses build on the methods and approaches of the foundation course. Three of them, D211 *Social problems and social welfare*, D212 *Running the country* and D213 *Understanding modern societies* have been specially devised in terms of teaching style and tutorial support as bridges from foundation course to second level. D211 may seem more familiar to D103 students because of its interdisciplinary issue-based form, but it also serves as a broadly based introduction to social policy. D212 links closely to D103 as well as to many second and third-level courses in economics, politics and geography. It looks at the institutions (including markets, bureaucratic managerial hierarchies and voluntary co-operation) through which collective action and social control are co-ordinated and put into practice. D213 is an introduction to a single discipline, but like D211 it has been designed so as to make the transition from foundation to second level as painless as possible.

These courses are of interest in their own right, but you should consider them particularly carefully if you are not yet fully confident of your grasp of material in the foundation course. They are especially recommended if you do not intend to take a second foundation course in another faculty, but of course there is no obligation to take them and you may feel more attracted to others in areas of more direct personal interest. All the second-level courses should be manageable for anyone who has completed the foundation course. Four other full credits and one half credit are available at second level, DT200 *An introduction to information technology*, D205 *Changing Britain, changing world*, D210 *Introduction to economics*, D213 *Understanding modern societies* and D251 *Issues in deafness*. All of them deal with important contemporary issues and develop themes of the social sciences in tackling them. DT200 looks at the social and technological questions raised by the introduction and spread of information technology, as well as teaching basic computer skills. D205 considers the relationships between recent social and economic changes in the United Kingdom and the rest of the world, and explores some of the conflicts between the pressures for social change and the needs of the physical

environment. D213, though based in the sociology area, is more interdisciplinary in character. It begins with an analysis of the formation of modern societies, moving on to the dynamics of contemporary industrial societies and concluding with a consideration of their transformation and change in the late twentieth century. D210 is an introduction to the main concerns and approaches of the study of economics. D251 allows a closer concentration on one area of social concern; it is part of a set of broader social policy courses, as well being of particular value to those who have a special interest in problems of deafness. MDST242 *Statistics in society* is described in the Mathematics Faculty section, but it is also an important part of our profile. It provides social scientists with a grounding in quantitative methods, which are useful not only for some third-level courses, such as DEH313 (from 1993), but also for other higher level study.

The range of courses at third level is similar to that at second, but here you can work on special interests and use and develop skills acquired in second-level courses. At third level you will probably be expected to move away from the usual unit format towards more independent work, using original articles, being expected to assess different theoretical approaches more critically, or writing more extended projects, dissertations or essays. You will have been prepared for this by your study of previous courses.

There are seven full-credit courses at third level, D307 *Social psychology*, D308 *Democratic government and politics*, D309 *Cognitive psychology*, D310 *Crime, justice and society*, D312 *Global politics*, D314 *Restructuring Britain* and D300 *Professional judgement and decision-making*. D307 and D309 are more specialist psychology courses which build on DSE202. D307 is also a good choice if you have a special interest in social policy or sociology. D308 and D312 are courses in government and politics. D308, raising questions about different forms of democratic organization, is suitable for anyone concerned with the operations and practice of public administration and the welfare state. D312 is of wider interest, for those seeking to develop an international aspect to their studies and starting from a base in geography or politics.

D310 is one of the Faculty's social policy courses, but is also related to sociology (as a more applied area of study) as well as being the first part of an Advanced Diploma in Criminology (Prison Studies) available in the associate programme from 1992. While D314 builds on the arguments of D205, it also draws on a wide variety of disciplines outside geography to examine the extent and direction of changes in the structure of economy, society and politics of the United Kingdom over the last twenty-five years. This is a valuable course for students who wish to put together a set of courses concentrating on contemporary developments within the United Kingdom.

D300 is a critical consideration of the ways in which decisions are made within professions, using examples from the medical profession and trying to develop practical guides to decision-making. Apart from its intrinsic interest, its analysis of decision-making makes it relevant to wider social policy, politics and economics courses.

There are three half credits at third level, D345 *Economics and government policy*, DE325 *Work and society* and DE354 *Beliefs and ideologies*. DE345 is an economics course, but also of value to those who want a degree profile which concentrates on the study of British government and politics or who would like to understand the context within which social policy is developed. DE325 and DE354 come within the sociology discipline. DE325 will be of interest to those who want to explore the changing nature of work in modern societies; it relates not only to other sociology courses, but also, for example, to DT200. DE354's also, for example, to DT200. DE354's examination of how we come to hold particular beliefs and how ideas and values help to maintain or change the power structures of society makes it centrally important to sociology, but the issues raised in it are relevant to other debates particularly within politics and social policy.

At fourth level you have an opportunity to investigate chosen topics more flexibly through a small number of guided study courses. These courses allow you to undertake more specialized and intensive study than is otherwise possible in the Faculty's courses. In 1992 there will be two fourth-level courses, D437 *Conflict and change*

Core disciplinary courses

	Second level	Third level
Economics	D210 <i>Introduction to economics</i>	D345 <i>Economics and government policy</i>
Geography	D205 <i>Changing Britain, changing world</i>	D134 <i>Restructuring Britain</i>
Government and politics		D308 <i>Democratic government and politics</i> D312 <i>Global politics</i>
Psychology	DSE202 <i>Introduction to psychology</i>	D307 <i>Social psychology</i> D309 <i>Cognitive psychology</i>
Social policy	D211 <i>Social problems and social welfare</i> D251 <i>Issues in deafness</i>	D310 <i>Crime, justice and society</i> D311 <i>Social policy and the family (from 1993)</i>
Sociology	D213 <i>Understanding modern societies (from 1992)</i>	DE235 <i>Work and society</i> DE354 <i>Beliefs and ideologies</i>
Interdisciplinary courses	D212 <i>Running the country</i> DT200 <i>An introduction to information technology: social and technological issues</i> D211, D310 and D314 are also interdisciplinary courses	D300 <i>Professional judgement and decision-making</i> DEH313 <i>Principles of social and educational research (from 1993)</i>

in the countryside and D440 *Perspectives on revolution*.

It is possible to identify core disciplinary courses on which to build if you want to specialize (see table above). But the discipline-based courses are not cut off from one another and can be used in a variety of ways. The social policy courses, in particular, should be seen as interdisciplinary, since their attention to applied policy means that they draw on a variety of disciplinary insights. D314, too, has an interdisciplinary structure, while D205 draws together different aspects of society in different areas and so has an interdisciplinary flavour. The key interdisciplinary courses at second level are D212 *Running the country* and DT200 *Introduction to information technology*. Both can make a valuable contribution to several different discipline-based course profiles. MDST242 *Statistics in society* is a useful foundation in quantitative methods. At third level D300 *Professional judgement and decision-making* could also be an important part of the concluding section of a degree based on several disciplinary specialisms.

Two courses which are to be presented for the first time in 1993 have not yet been discussed: D311 *Social policy and the family* and DEH313 *Principles of social and educational research*. D311 breaks new ground by bringing together contributions from psychology and sociology in a way that relates to our personal experiences. It examines the changing meanings and associations of 'the family' and looks at the dynamics and realities of family life. It also considers how welfare is provided through the shifting relationships between the state, family and market. DEH313 is an introduction to research principles and is relevant to most areas of social science and education. It will enable you to read and evaluate research and acquaint you with current debates about the role of research in the creation and refinement of theory and policy. It is a less specialist course than its predecessor (DE304), with more emphasis on principles than on methods.

Of course, there is no need to use our disciplinary structure as the basis of your degree. Our intention is to provide as wide a choice as possible. That is one reason for our support for interdisciplinary courses at second level, even if they often have some disciplinary emphasis of one sort or another. It would be possible to concentrate mainly on interdisciplinary courses (for example around a core of D211, D212, DT200, D300, D310 and D314), or you can put together your own selection, perhaps drawing on relevant courses from outside the Faculty, particularly from the 'U' area. (U204 *Third World studies*, U205 *Health and disease*, U206 *Environment*, U207 *Issues in women's studies*), but from other areas too. As you do so, however, it is important to remember that the pattern of courses offered in the Faculty does have some coherence, not only in terms of subjects covered and the approaches of the social sciences but, perhaps more important from your point of view as a student, in terms of educational progression.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and presentation dates are listed in Table III.

D103 SOCIETY AND SOCIAL SCIENCE: A FOUNDATION COURSE

Foundation level: full credit

What does an everyday task like shopping for food have to do with social science? What determines the food we eat — personal preference, the advertisers, the producers, the international market? How can changing patterns of health be explained? How are we as individuals shaped by the societies around us? How is our society shaped by its place in the world? These are just some of the questions D103 asks. The main aim is to help you broaden and deepen your understanding of the diverse society in which we live. With this in mind we investigate how historical and international processes affect our lives in terms of culture, economy, social structure, politics and ourselves as individuals.

Since social scientists disagree about what the 'right' answers are to important social questions, you will be able to engage in stimulating debates and try to sort out for yourself the merits of different explanations. D103 offers guidance as to how you might construct your own answers. As well as studying particular theories of sociologists, economists, political scientists, psychologists and geographers, you will be invited to examine the broad traditions of thought most influential in Western thinking over the last two hundred years — traditions such as Liberalism, Marxism, Conservatism — and to assess the implications of these for social science and social practice.

Content There are seven blocks of course material, each four or five weeks' work. The first sets out the main concerns of the course through an investigation of the food we eat, why we consume these foods and why people in some parts of the world cannot get enough to eat. The second block begins to examine social structures and divisions such as race, gender and class. What difference does it make to your experience of living in the UK if you are from a particular social class or particular region, if you are a woman, or black? In Block III you will study the economy, looking at the nature of work

(paid and unpaid), the extent to which economies are sensitive to market forces, and the role of the state in relation to the market. This links directly to Block IV's primary concern with important elements of the modern British state. The block discusses how these have been shaped historically and makes clear the international context in which the modern state functions. It not only raises questions about the nature of our political institutions and how they work but also looks at the role of ideas in society. Block V follows by asking how individuals use these ideas to make sense of society and the consequences this has for social practice, individual behaviour and identities. Questions raised here include: how do people become 'socialized'? How much of this is determined by biology, how much by the culture in which we live? Regional cultures and identities are taken up in Block VI, which examines regional and urban inequality, how this has changed over time and how it is linked with the workings of the international and political order. The concluding Block VII concentrates on the influences of social science on society and on the traditions of thought you have been studying throughout the course. These different traditions are applied in short essays analysing the main problems of contemporary UK society, written by practising social scientists who, broadly, represent each tradition. We reflect on how you might decide which of the traditions, or some combination of them, makes most sense to you. The block includes a revision of the main themes of the course and advice about revision techniques and how to approach the examination.

To help you gain the maximum benefit from the course you will be given expert guidance throughout on, for instance, taking notes, interpreting numerical tables, writing essays and many other study skills.

We want to encourage students from as wide a range of different backgrounds as possible (for instance, students with disabilities or from different ethnic groups) to study with us on the course.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [D100], [D101], [D102].

Assessment Seven TMAs (50%) and the examination (50%). There is also a formative assignment at the beginning of the course, not used for assessment. Substitution can apply to one TMA.

Broadcasts and cassettes The television broadcasts are integral to this course and expand and develop ideas raised in the written material. Time will be set aside in your study schedule to watch and work on the sixteen programmes, each of which is 50 minutes long. A media booklet guides you through this important part of the course and some TMAs may have, as one choice, a question based mainly on a TV programme. The programmes are not only linked to the material in each block, but twelve of them are also linked as a series about modern British society. You will be taught how to study and 'decode' television material.

There are also regular radio broadcasts giving you up-to-date information about the course and about the TMA question you are working on. Audio cassettes reinforce the other course components and help you with your study skills.

Residential school A one-week course-based summer school, engaging you in activities which can only be done in a residential setting. They will be directly related to the course — particularly to Blocks V, VI and VII.

Preparatory work A specially designed package of materials will be sent to you in the October before you begin your studies to help you prepare yourself for the course.

Students with disabilities Course and supplementary materials (including set books) are available on tape for visually impaired students. Transcripts of cassettes and radio programmes are available for hearing-impaired students.

Set books A. Northedge *The Good Study Guide*. Course reader: J. Anderson and M. Ricci (eds) *Society and Social Science: A Reader*, both published by The Open University.

D205 CHANGING BRITAIN, CHANGING WORLD: GEOGRAPHICAL PERSPECTIVES

Second level: full credit

This course is about the geography of social and environmental change. It raises questions that are central to understanding the processes which

are re-shaping the social and economic face of society. How has the class map of Britain changed in recent years? How and why has Britain's position in the world economy been changing? What social and ecological effects is industrialization having on Third World countries? Are the world's resources running out? Are we facing the prospect of eco-doom?

You will find that these issues are analysed in a way which is interesting and suitable for two types of students: those who want a clearer understanding of the geography of world change and those who want an introduction to questions, topics and explanations dealt with by geographers.

Content There are three themes running through the course. The first explores the relationship between society and nature, the attempt to exert social control over the environment and how this affects the world we live in. The second theme examines the relationship between society and its spatial organization. It shows how distance and place affect the organization of production, the distribution of goods and the provision of services. The third theme examines the changing forms of interdependence between nations and between regions, and the effects these have on local societies and their prospects for development.

Block 1 *Introduction: issues and themes* sets the scene with examples drawn from north-east England and the wider world.

Block 2 *Industry and resources* analyses some of the building-blocks of the geography of society. Individual units are concerned with basic principles of the siting of industry, multinationals and how to analyse them, the making of the world economy, and natural resources and social change.

Block 3 *Land use and services* examines the internal organization of cities and the geography of social services. Units look at urban land use, the geography of housing and patterns of inequality of access to health care.

Block 4 *Culture and conflict: views of space, place and nature* challenges some of our accepted notions of nature and of our relationship to land, the environment and the politics of territory. Units deal with questions of land-ownership, with 'place and perception', with environment and politics in capitalist societies and in centrally-planned societies, and finally with 'geopolitics'.

Block 5 *The changing face of the British Isles* is concerned with the different kinds of change experienced in different parts of the British Isles in response to wider global change. Units look at the influence of multinational investment upon a traditional rural community in the West of Ireland, the inner city problem in Britain and Britain's north-south divide.

Block 6 *Uneven development and the world order* looks at the changing social and economic fortunes of nations in a world bound together by an international economy. Units investigate the rise of newly industrializing countries, the effect of rapid industrial growth upon the Brazilian way of life, the consequences of Islamic resurgence and the politics and economics of famine.

Block 7 *Geography and society* draws together the central arguments of the course to show how geography matters to the way in which society develops. The units take the examples of regional nationalism, regional policy, EEC development and international pollution to show how geographical differences and nature can have a significant influence on social change.

Block 8 A review of the themes and content of the course.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses D205 is a suitable sequel to [D102]/[D103] and has strong connections with such courses as [D202], [D208], [D209], [D210] and [D314]. It is also suitable for students who are not concentrating on social science courses, as it has links with [T102], [T234] and [T274]. There are also strong links with [U204] and [U205].

Assessment TMAs 02-07 (50%) and the examination (50%). Substitution can apply to one TMA. TMA 01 is formative and will not be used for assessment.

Broadcasts The fourteen TV programmes play an important part, particularly to add to treatment of problems and case studies dealt with in the units. There is special emphasis on material from Brazil and Spain, and other programmes deal with Ireland and Bangladesh as well as places in the UK.

Students with disabilities If you have a visual handicap you may have substantial difficulties in

dealing with numerous maps and diagrams, but not greater than most other social science courses. Students with an aural handicap may have some difficulties as TV is important to assessment.

Set books There is a course reader: D. Massey and J. Allen (eds) *Geography Matters*, Cambridge University Press/Open University. You will be sent the *Third World Atlas* as part of the course material.

D210 INTRODUCTION TO ECONOMICS

Second level: full credit

This course introduces economics by examining issues to do with the UK economy. If you want to understand the economic problems of the day, this course will help you do just that. Booms and slumps, inflation, the balance of payments, the EMS, unemployment, the apparent decline of British industry, technological developments, inequalities of wealth and income and the changing role of the state are all included. The course sets out and clarifies various ways of understanding these issues, recognizing that economists often differ in their explanations.

In teaching the economic theory care is taken to build up concepts systematically and to provide regular breathing spaces so that you can consolidate your own work. There are four audio cassettes and one video cassette (and accompanying booklets) to help you work through the theory at your own pace. In this way D210 has been designed both for students who want a single course in economics and for those who wish to look ahead to further, more specialized courses.

Content

Block 1 examines booms and slumps in an historical context by looking at fluctuations in economic activity. It also introduces the important debate between Keynesians and monetarists.

Block 2 looks at British manufacturing and examines its rise and relative decline within the world economy. It continues the historical outlook of the previous block and also looks at the place of the UK economy as part of the world economy.

Block 3 takes up this international perspective by analysing changing patterns of world trade and exchange; demand and supply analysis is introduced and illustrated using international commodity markets. This block also examines post-war balance of payments policies and the role of money and international currencies.

Block 4 considers the structure of production and how firms operate. It examines costs, efficiency, mergers and the changing concentration of production. It also analyses different market structures such as competition and monopoly, and the effects these may have on prices, costs and profits.

Block 5 is about income and wealth. It looks at inequalities in the distribution of income and wealth, and how earnings are determined for different occupational groups. State involvement in the distribution of income and wealth is considered, both in the UK and in the USSR.

Block 6 examines unemployment. Different explanations are considered, including free market analyses which stress the effects of high wages, Keynesian explanations which stress the need for state involvement, and technological explanations.

Block 7 builds on all the previous blocks by developing a model of the economy as a whole. Here the debate between Keynesians and monetarists over the role of the government is examined in detail. Discussion of policy includes demand management, inflation, exchange rate policy, the EMS, and supply side policies. The last unit is a double unit revising the course and helping you to prepare for the examination.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [D222], [D282] and [D284].

Related courses If you have taken D205, [D208], [D209], [D314], [U204] and some interdisciplinary courses you will have encountered ideas and issues that relate directly to D210. D210 is a recommended prerequisite for D345.

Assessment Seven TMAs (50%) and the

examination (50%). Substitution can apply to one TMA.

Cassettes There are four audio cassettes and one video cassette.

D211 SOCIAL PROBLEMS AND SOCIAL WELFARE

Second level: full credit

This course provides a link between the social sciences foundation course, [D102]/[D103], and other second and third-level courses in the social sciences. It retains [D102]/[D103]'s interdisciplinary basis, together with the concern to explore competing approaches to social issues. It looks at how social problems are defined, and at some of the types of social intervention that are intended to resolve social problems and promote social welfare. In particular, the course examines some of the contemporary debates between advocates of free market solutions, state intervention, and decentralized or community-based programmes.

Content The course has five blocks:

Block 1 examines how social pressures shape our life experiences: birth, childhood, adolescence and old age. Through these topics the block provides an introduction to social problems and the causes and consequences of social intervention.

Block 2 looks at the condition of the family in contemporary Britain and explores debates about the role of the family in both creating social problems and promoting social welfare. The block provides a critical analysis of conventional definitions of the family, and contrasts images of family life with the diversity of living patterns which are to be found in Britain today. This block also examines the influence of social policies on the family and the influence of ideas about the family on social policy.

Block 3 deals with the growth of social work as one distinctive form of social intervention. It traces some of the continuities and changes in social work from its nineteenth-century origins to present-day arguments about its effectiveness. The block looks at several aspects of contemporary social work: the role of family centres, concern about child abuse and different methods of providing care. From these studies the block examines some of the wider issues to do with the problems of social intervention, and uses them as a basis for considering competing views about the future of social work in Britain.

Block 4 looks at the connections between social welfare and Britain's economic decline. The block examines both the process of that decline and some of the remedies that have been put forward for economic recovery. Special attention is given to the renewed interest in the role of market forces in reviving the national economy. The resurgence of interest in the role of local or municipal socialism in tackling social inequality and regional decline is also an important topic.

Block 5 concludes the course by considering two important questions. The first is what contribution social science can make to the solution of social problems and the promotion of social welfare. The second takes up a different view of the 'crisis' of British society. To what extent is Britain undergoing a moral crisis, in which traditional values have collapsed and lawlessness is increasing? The block uses these two questions to present a substantial review of the course as a whole.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite [D102]/[D103].

Complementary and related courses D211 is intended to provide a good basis for further study within the social sciences. At second level, it is a useful complement to [D207], [D208] and [D209], and is of particular relevance if you are considering studying [D310] or [D311] (new in 1993).

Assessment Seven TMAs (50%) and the examination (50%). Substitution can apply to up to two TMAs.

Broadcasts and cassettes There are sixteen TV programmes and six audio cassettes.

Set books M. Loney, R. Bocock, J. Clarke, A. Cochrane, P. Graham and M. Wilson (eds) (1992) *The State or the Market: Politics and Welfare in Contemporary Britain*, 2nd edn., Sage (course reader).

D212

RUNNING THE COUNTRY

Second level: full credit

Running the country, a new interdisciplinary course, examines the British institutions and organizations through which large-scale collective social activity is co-ordinated and implemented. It also considers the increasing importance of Europe and the world for British institutions and organizations as the year 2000 approaches. It draws heavily on the government, economics and sociology disciplines, although other disciplines within the social sciences also make an important contribution. It is designed for students who have recently completed a foundation course and therefore places a considerable emphasis on the progressive development of study skills throughout the year. It could profitably be combined with many other courses at second and third level. Other interdisciplinary courses and courses in the government, economics, sociology and geography disciplines would be particularly appropriate.

Broadly, the course will help you to understand how some important British industries, services and institutions, both public and private, are organized and run. Using case studies such as the health service, the motor industry and the provision of financial services, the course examines their structure, how they are organized and how much they have changed in recent decades. There is also a survey of British political, economic and social history since the end of the Second World War which establishes the broad context for the industries and institutions examined in the course. Theoretical material, particularly on the nature of markets and bureaucratic and managerial hierarchies, is also introduced.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [D203], [D208].

Recommended prerequisite A102 or [D102] D103.

Complementary and related courses D205, [D207], [D208], [D209], D210, D211, D213, D308, D312, D314, D345.

Assessment Eight TMAs (50%), two non-assessed CMAs and the examination (50%).

Broadcasts and cassettes Ten television programmes, six radio programmes and six audio cassettes.

Set books There is a reader and two sets of books.

D213

UNDERSTANDING MODERN SOCIETIES

Second level: full credit

D213 is a wide-ranging introduction to sociology which analyses the historical formation, contemporary character and future trends of modern industrial society. It is interdisciplinary, going beyond the traditional boundaries of sociology and using insights and analyses from politics, geography and economics to give a comprehensive picture of the institutions and processes of contemporary social life. It is historical: it traces the origins of capitalism, individualism, the nation-state and the global economy, and it assesses the continuing relevance of the classic nineteenth-century theorists who can be said to have founded 'the science of society'. And it is comparative, examining both liberal democracy and socialist states, and assessing the influence of the West on the Third World.

An important aim of the course is to introduce original materials - classic texts and articles. A typical unit combines 12,000 words by the author with 6,000 words of carefully chosen extracts from the best historical and contemporary writers.

D213 develops many of the themes, ideas and skills of D103, the social sciences foundation course. It is suitable for students who have already taken one or more social science courses, or who have some background in history; and it is essential for those who wish to take further courses in sociology and related areas. If you are studying science, technology or mathematics and are considering taking a social science course to broaden your degree, we think

you will enjoy D213 and will gain from it a better understanding of yourself and society.

Content The course is in six blocks:

Block 1 *The formation of modern society* opens with a study of the Enlightenment and traces the emergence of modern politics and forms of state, industrialized economies, class and social divisions, contemporary culture, and the influence of the West on the rest of the world.

Block 2 turns to contemporary politics with an analysis of democratization, the state and power in advanced industrial society, citizenship and the idea of the welfare state, and new social movements such as feminism and the 'greens'.

Block 3, on the economy, discusses the global market, Fordism, shifts in traditional occupations, classes and new social divisions, and personal experiences of conflict and control at work.

Block 4, on the social dimension, examines the family and the household, lifestyles and consumption, the self and social interaction, the body and sexuality.

Block 5, on culture in modern industrial society, looks at contemporary beliefs and ideologies, the mass media and popular culture, education and the idea of the modern city.

Block 6 *Modern society and its futures* analyses the forces, processes and institutions that are reshaping modern society. There are units on the environment, globalization, post-industrialism, trends in capitalism, socialism and democracy, social diversity and cultural identity. The conclusion is about understanding social change.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [D207], [D283].

Recommended prerequisites [D102], [D103], A102.

Complementary and related courses [D209], D205, D211, D212, D308, D312, D314, DE354, DE325, [U221], U207.

Assessment Probably seven TMAs (50%), the first of which will not be assessed, and the examination (50%).

Broadcasts and cassettes Eight television programmes, eight radio programmes and four audio cassettes.

Set books The course itself is likely to be produced as four textbooks with supplementary materials. You may need to buy a *Dictionary of Sociology* (£4.95 at present).

D251

ISSUES IN DEAFNESS

Second level: half credit

D251 introduces the study of deaf people, their community and language. It examines issues in the areas of social policy and psychology from the point of view of deaf people and the social agencies with which they interact. It will be of interest to deaf people and their families, professionals who deal with deafness, those interested in linguistics and members of disability, equal opportunities and minority groups.

This course is Part One of the Professional Diploma in Social Work with Deaf People (D09).

Content

Block 1 *Deaf worlds* The course starts with an introduction to the deaf community and its culture, using a video study of a deaf family in which deafness can be traced back through many generations. We then examine the concepts of community and culture within an international and historical context. The next section, supported by a video, considers communication and deafness: British Sign Language (BSL), the language of deaf people, and general questions of linguistics in relation to BSL. The next section analyses social divisions within the deaf community by looking at experiences of members of particular groups such as black people, elderly deaf people, gay and lesbian deaf people.

Block 2 *Deaf people in hearing worlds* examines the consequences of a system of education which until recently refused to recognize BSL, and discusses the current emphasis on integration in schools. We move on to examine

deafness in terms of mental illness as a commodity to be treated by professionals, and assess the 'discourses' which have given rise to the notion that deaf people have particular personality traits. We then look at the development of welfare and social work in relation to deaf people and consider current debates about it.

Block 3 *Constructing deafness* examines different perceptions of deafness. We look at the social construction of deafness, concentrating on accounts of deaf people themselves, the powerful professional domain, academic discourse and the portrayal of deafness in literature, film and theatre. We then investigate both personal involvement in and academic accounts of the activist movement. A concluding video-based unit reviews the course and looks at the future of the deaf community in relation to art, technology and politics.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses D211, D307, D309, [DS262], DSE202, [E354], ED356 (new in 1992), U207, [U221].

Assessment Four TMAs (50%) and an examination (50%). Substitution can apply to one TMA.

Students with disabilities The visual nature of much of the course material could present difficulties for those with impaired sight. Since this course may be of particular interest to some students within this group, you are invited to seek advice from the course team before applying; write to the D251 course manager, The Open University, Milton Keynes MK7 6AA. Course and supplementary materials are available on tape.

Cassettes Four video cassettes are an essential part of the course.

Set books You must buy D. Miles, *British Sign Language*, BBC; and J. Kyle and B. Wolf Sign Language - the Study of Deaf People and Their Language, Cambridge University Press.

You will receive as part of your course material: J. Bishop and G. Taylor (eds.) *Being Deaf: the Experiences of Deaf People*; S. Gregory and G. Hartley (eds.) *Constructing Deafness*.

Special features You must have the use of a video-cassette player.

D300

PROFESSIONAL JUDGMENT AND DECISION-MAKING

Third level: full credit

A course about how and how well professionals deal with individual cases and about how they could and (perhaps) should deal with them. Our aim is to provide you with the background you need to understand and take part in debates about the quality of professional judgment and decision-making. These processes have become the subject of an increasing number of legal cases and public inquiries and there is growing political and public interest in their effectiveness and accountability.

Content Using medicine as its case study and presenting the debate in the form of a dialogue, the course examines competing views about the quality of professional judgments in individual cases. Errors in reasoning, inefficient use of resources and insufficient consideration of patients' values are three of the main 'diagnoses' considered. The 'treatments' discussed include the adoption of formal, and typically computer-based, judgment and decision aids (such as expert systems, decision analysis programs), more peer review and the reform of the education of professionals so as to equip them with improved judgment and decision-making skills.

We begin at the level of the individual interaction between professional and 'client' (Units 1-7), and move on to the politico-economic, ethical and legal contexts (Units 8-10). Unit 11 looks at the education and wider socialization of professionals (and their clients) and discusses current and possible future changes. The debate is conducted within the contrasting but related cultures of Britain and North America.

Most of the case material is medical but the course is intended for all those who deal with individual cases and all those involved in or affected by their judgments and decisions. There is some supplementary material on other professions and you can select an area of

'personal interest' for part of your work.

The course introduces at a very basic level the kinds of analysis and technique which are necessary for informed participation in discussions about the quality of professional judgment and the merits of decision support systems. If you have little numerical background you are likely to find these aspects of the course demanding, but the presentation has been designed with you in mind. The three assignments that establish your competence in the relevant techniques (e.g. constructing a simple decision tree, using Bayes theorem to assess the odds of a patient having a disease) are carefully guided.

The course is television-based and you must be able to watch the programmes. The *Introductory Texts* summarize the main points of each programme and provide a lengthier discussion of their main themes as well as supporting material and examples. They also introduce the extended treatments in the set reading, which comes in a reader and supplementary offprints.

A particular feature of the course is the relationship between its content and its assessment. You will be exposed to, as well as studying, professional judgment and we have taken the opportunity to make the assessment of the course a part of its subject matter. By course assessment we mean both our assessment of your work and your assessment of ours: we will be asking you to make brief judgments of the course and its teaching as part of your assignments. Since this may create some worries we have developed ethical codes for students, tutors and course team. It will be assumed that if you finally register for D300 you have given your informed consent to the ethical code and read the matching code agreed to by your tutor and the course team. If you are contemplating taking the course and would like to see a copy of these codes, you should write to Jack Dowie, Social Sciences (Gardiner), The Open University, Walton Hall, Milton Keynes, MK7 6AA.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination D321, which it replaced.

Assessment (i) Continuous assessment (50%); eight TMAs; substitution can apply to two from five of the assignments (i.e. three are not substitutable); three of the TMAs are to be written as dialogue; (ii) the examination (50%).

Tuition We hope to provide the standard amount of tutorial support and some inter-regional day schools.

Broadcasts Eleven television programmes.

Students with disabilities If you have impaired sight or hearing you will be hindered by not being able to take full advantage of the television programmes.

Set books A specially prepared reader: J. A. Dowie and A. Elstein (eds) (1988) *Professional Judgment: a Reader in Clinical Decision Making*, Cambridge University Press.

D307

SOCIAL PSYCHOLOGY: DEVELOPMENT, EXPERIENCE AND BEHAVIOUR IN A SOCIAL WORLD

Third level: full credit

D307 is a central part of the set of courses which contributes to an honours degree recognized by the British Psychological Society (see Section 1 of this publication). The course is designed not only for those who intend to specialize in psychology but also for students who have a wider interest in social science and those whose primary interests are in arts subjects and who wish to increase their understanding of the development, experience and social behaviour of people in the context of the societies and cultures in which they live.

Content The course is structured loosely around the chronological development of individuals. It consists of seven blocks which vary in length from two to six weeks' work. Alongside these blocks you also study an integrative block which discusses the philosophical underpinnings of theories and methods, makes cross-references between the substance of blocks, highlights problems and controversial issues and

serves course with ap relevant course The by which social language and inter theme 'communi explorati consciou self. view shif theory. T attitudes how to v group me movement Thus the subject ma context.

NOTES FOR

Excluded co

Recommended [DS262], DS

Complementa and E362 ar would contri Society recog

Assessment (ii) TMA 04 (i integrative) (2 Substitution ca

One project as essay TMAs will be possible are houseboun a computer Computing Se require use of

Cassettes You returnable vide practical projec

Set books J. Dialogues of Lawrence El Himelweit, How Voters edn.), R. Sto University Pre

D308

DEMOCRACY, GOVERNMENT AND POLITICS

Third level:

D308 is about the kind of democracy? H maintained an these issues 'democracy', 'flic' across a se ments and g historical. With comparative u governmental also examine political phen at the supran At the ind have been oc and many pe constitutes w and public al these changes political part movements su the 'greens', democracy. B should be ab view of wh understand wh today as contr its long history

Content

Block 1 exam ideas and inst

Block 2 look

serves a review function. Where appropriate the course makes reference to or deals more fully with applied social psychological research and its relevance to everyday life. This concern with the relevance of research is also reflected in the course reader and in the use of project work.

The course begins by describing the process by which an infant is integrated into her or his social world. The second block continues with social development by emphasizing the role of language and cognitive development in action and interaction with others. Block 3 takes up the theme 'Relating to Others', and deals with communication and interaction. Block 4 is an exploration of the dimensions of personal consciousness and the process of understanding oneself. In Block 5 the individualistic point of view shifts towards collective representations of the world with a discussion of classical attitude theory. This is then broadened to consider how attitudes and beliefs relate to decisions about how to vote. The experience and effects of group membership and the psychology of social movements are explored in Blocks 6 and 7. Thus the course begins and ends by setting the subject matter into a wider social and cultural context.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [D305].

Recommended prerequisites [D102]/D103, [DS262], DSE202.

Complementary and related courses D309, E206 and E362 are suitable complementary courses and would contribute towards the British Psychological Society recognized set.

Assessment (i) TMA's 01, 02, 03 and 06 (28.5%); (ii) TMA 04 (project, double weighted) and TMA 07 (integrative) (21.5%), and (iii) the examination (50%). Substitution can apply to one TMA in (i) only.

One project (to be chosen from five options) as well as essay TMA's makes up the continuous assessment. It will be possible to choose suitable practical work if you are housebound. One option requires either access to a computer terminal or use of the Academic Computing Service postal service; and two projects require use of a VHS video machine.

Cassettes You will receive an audio cassette and a returnable video cassette associated with work on practical projects.

Set books J. Murphy, M. John and H. Brown (eds.) *Dialogues and Debates in Social Psychology*, Lawrence Erlbaum Associates (course reader). H. Himmelweit, T. Hilde, P. Humphreys and M. Jaeger *How Voters Decide*, Open University Press (2nd edn.). R. Stevens *Freud and Psychoanalysis*, Open University Press.

D308

DEMOCRATIC GOVERNMENT AND POLITICS

Third level: full credit

D308 is about a series of issues fundamental to the kind of society we live in. What is democracy? How has it arisen? How can it be maintained and developed? The course tackles these issues by tracing the themes of 'democracy', 'autonomy', 'freedom' and 'conflict' across a selection of political systems, movements and groups, both contemporary and historical. Within this strategy it offers a good comparative understanding of the political and governmental systems of two western states and also examines the growing importance of political phenomena which manifest themselves at the supranational level.

At the individual level significant changes have been occurring in modes of political activity and many people's attitudes to what (if anything) constitutes worthwhile involvement in politics and public affairs. D308 attempts to analyse these changes by examining developments in political parties, the growth of international movements such as the women's movement or the 'greens', and experiments in industrial democracy. By the end of the course you should be able to formulate your own reasoned view of what constitutes 'democracy' and understand why this complex yet popular idea is today as controversial and alive as at any time in its long history.

Content The course is in seven blocks.

Block 1 examines how and why democratic ideas and institutions have arisen.

Block 2 looks at how 'democracy' can be

defined and at the development of competing ideas about the kinds of democracy that are possible and desirable.

Block 3 starts with an examination of US political culture, the institutions of US government, and how public policy is made. Then a parallel and comparative study is made of France. Finally there is a discussion of some general questions concerning the comparison of different political and governmental systems.

Block 4 looks at changes to existing democratic forms and examines issues such as democratic politics in Eastern Europe, the effects of nationalism and the influence of supranational institutions and global networks.

Block 5 The emphasis is on innovations in contemporary democratic theory and practice. The block looks at new forms of democracy such as industrial democracy and the women's movement and examines the possible extension of democracy into sectors such as foreign policy where 'reasons of state' have often been used to limit democracy.

Block 6 The goal is to encourage you to relate course work to contemporary political phenomena. A choice of one from at least three options will be available. The options will be guided reading of a prescribed text or deeper study of an area covered earlier in the course.

Block 7 A review of the main themes with revision in mind.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [D208] and/or [D209]. D308 has been designed with the contents of [D102]/D103, [D208] and [D209] very much in mind.

Complementary and related courses D308 is complementary to [D208] and [D209], both in its focus on democratic processes and institutions and in its choice of cases.

Assessment Seven TMA's (50%), seven non-assessed CMA's and the examination (50%). Substitution can apply to one TMA but not to the project TMA related to Block 6.

Broadcasts and cassettes Eight television programmes are concentrated on just two parts of the course. The first set is connected to Block 3, looking at aspects of the US political system. The second set is linked to Block 5, examining some of the new forms of democracy with which that part of the course is concerned. There are also eight one-hour audio cassettes spread throughout the course.

Set books D. Held *Models of Democracy*, Polity Press, V. Wright (1988) *The Government and Politics of France*, Unwin Hyman (3rd edn.).

Two course readers, *The American Political Process and New Forms of Democracy*, will be sent to you as part of the course material. The Block 6 options may require the guided reading of an extra text which you will be asked to obtain.

D309

COGNITIVE PSYCHOLOGY

Third level: full credit

D309 is an essential course for students who want recognition of their degree by the British Psychological Society (see Section 1).

The course will acquaint you with the most important theories and methods of cognitive psychology. It is concerned with higher mental processes and the ways in which knowledge is acquired, stored and used, and it emphasizes the relevance of the theories and findings of cognitive psychology to mental activities in everyday life. Three methods are introduced: experiments, computer models and introspection. Full instruction will be given in writing simple computer programs, in experimental design and statistical analysis, which requires only basic arithmetical skills.

Content There are four main areas:

Memory Everyday memory; working memory; encoding and retrieval.

Language understanding Language and knowledge; models of language understanding.

Problem-solving Models of problem-solving; production systems and cognitive skills.

Perception and representation Conceptual categories; seeing objects; the computational approach to vision.

These four topics are in the form of books, with the same titles, in the *Open Guides to Psychology* series, published by Open University

Press. You will not need to buy them; they will be sent to you.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [D303].

Recommended prerequisites DSE202 or [DS262] since they cover the introductory material that is the basis for more detailed treatment in D309.

Assessment TMA's 01-08 (50%) and the examination (50%). Substitution can apply to up to two TMA's.

Computing Computing is introduced at day and residential schools for writing artificial intelligence programs and for controlling experiments.

Residential school A one-week course-based summer school, providing experience and training in experimental methods and in writing simple computer programs.

Students with disabilities No special problems are expected, although if you have a visual handicap you may have substantial difficulties with home experiments.

Set books A. M. Aitkenhead and J. M. Slack (eds.) *Issues in Cognitive Modelling*, Lawrence Erlbaum Associates (course reader). A. W. Ellis *Reading, Writing and Dyslexia: a Cognitive Analysis*, Lawrence Erlbaum Associates. J. Greene and M. D'Oliveira (1985) *Learning to Use Statistical Tests in Psychology: a Student's Guide*, Open University Press (in the series *Open Guides to Psychology*).

D310

CRIME, JUSTICE AND SOCIETY

Third level: full credit

How much crime is there? Is there a criminal personality? Is the law the last defence of the social order? Why is there a crisis in the prisons? To whom are Chief Constables and the police accountable? Why is there a separate juvenile system? Where do our ideas about crime and the criminal come from? What should we do with long-term prisoners? Are poverty or the weakening of family discipline sufficient explanations for the rising rates of crime? Are women less criminal than men? Is there really a rise in crime — and, if so, are we right to interpret it as a symptom of growing social conflict or the break-up of society? Is crime the same in every society? Do we need more or less law and order?

These are some of the questions considered in *Crime, justice and society*. In recent years such questions have come to the forefront of public attention. They are matters for urgent debate in government; they are widely discussed in the media and everyday conversation. D310 has been designed as a broadly based interdisciplinary social science course. It examines both historical and current issues concerning the nature of crime, the functioning of the law and the criminal justice system. It is not a specialist course in criminology. Rather, it uses questions of crime, the law and the machinery of justice to explore the nature of social order; to examine how conflicts and disputes in society are regulated; and why individuals do or do not conform to the norms and standards of behaviour prescribed by the social order. We examine crime and the law as vantage points from which wider descriptions and explanations of how society works can be surveyed.

A degree of independent study is encouraged through use of a course reader, study guides, set books and supplementary readings, which culminates in an opportunity to explore in detail an aspect of crime, the criminal justice system (including prisons) or criminology which is of particular interest to you.

Content The course has five blocks. There is a choice of two routes through the last block of the course.

Block 1 An introduction to the course raising such issues as the quality of media representations of crime; the extent of crime; the causes of crime and how it can most effectively be controlled.

Block 2 traces developments in changing patterns of crime and transformations in the law and machinery of justice in Britain from the eighteenth to the mid-twentieth century. It provides the necessary historical basis for understanding the present character and problems of crime and the law in the light of their past development.

Block 3 deals with contemporary institutions of justice such as the police, courts and the penal system as they affect both adults and juveniles. As well as providing a guide to the criminal justice system, it also identifies controversial questions in it such as police accountability, the impartiality of the judiciary and the effects of imprisonment, and assesses the relative merits of the separate system of justice that has developed in Scotland.

Block 4 draws on the disciplines of sociology and psychology to examine how crime and the law have been analysed and explained within the social sciences. It surveys some of the most recent significant developments in the theory and explanation of crime and law.

You choose one of the following two options for the next block:

either

Block 5 which offers a critical analysis of research methods within criminology, through the analysis of a set text on 'hooliganism'. This is used as an example of how criminological texts can be subjected to critical inquiry and how different research agendas may suggest alternative approaches. In the final double TMA you are required to reflect on these issues with a view to presenting your own ideas for further research in a subject area of your own choice.

or

Block 5A, which looks at issues and methods in research on institutions. You will be required to read and appraise several prison research papers, relate them to theoretical material studied earlier in the course and produce an outline for further research. Prison research is the main theme of the block, but the issues and methods discussed are equally applicable to other institutions and to other aspects of the criminal justice system.

***Block 5 options** An Advanced Diploma in Criminology (Prison Studies) (D08) begins in 1992. If you complete the Block 5A option you will be able to count D310 as the first of two full credits for this diploma. The second, postgraduate part of the diploma, the course D803 Doing prison research, will be available only in the associate programme.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [D335], which it replaced; [D431].

Usually students who have passed a course from an excluded combination may not register from another course from the same excluded combination. However, in this instance, if you have successfully completed [D335] but have not had it included in the award of a BA degree, you may register for D310 on condition that if you pass D310 you relinquish the half credit you obtained for [D335]. You will not be allowed to base your decision on the grade of pass obtained for D310. If a pass is awarded for D310, then whatever the grade, the half credit for [D335] must be relinquished. Virtually all the teaching material from [D335] has been incorporated in D310. If you wish to take up this option in 1992 you should consult your tutor-counsellor first.

Recommended prerequisites [D102]/D103 and [D207] or D211 or [DE206] or [DS262] or DSE202. D310 provides an applied area for students who have already studied courses in the psychology or sociology disciplines.

Complementary and related courses A310 [D208], [D209], D231, D311 (new in 1993), [D355], D803 (part of D08), [E205].

Assessment TMA's 01-06 (50%) and the examination (50%). Substitution can apply to one of TMA's 01-05. TMA 06 is a compulsory double-weighted assignment and cannot be used for substitution; it will have a threshold of 30%.

Cassettes Important issues raised in the course are given further analysis on five audio cassettes.

Set books G. Pearson *Hooligan: A History of Respectable Fears*, Macmillan. P. Marsh, E. Rosser and R. Hané *The Rules of Disorder* (set book for Block 5 only). Routledge. F. Heidensohn *Women and Crime*, Macmillan. M. Fitzgerald, G. McLennan, J. Pawson *Crime and Society*, Routledge (course reader).

D312

GLOBAL POLITICS

Third level: full credit

This course explores the main characteristics of the contemporary global political and economic orders, and in doing so examines the limits of state autonomy in an increasingly interdependent world. For example, we are all aware just how far events abroad, like the burning of the

rainforest in Brazil or the political protests in South Africa, have global political consequences. D312 gives particular attention to the powerful forces which determine what governments around the world can and cannot do.

Content

Block 1 Introduction to the course

Block 2 Superpower rivalry and global political competition (6 weeks) One of the main features of the modern international political world has been the onset of the cold war and the resurgence of a second cold war that has shaped international relations in the 1980s. This block examines the origins of the second cold war and some of its implications for contemporary global politics and the politics of three regions: Central America, the Middle East, and South Asia. It explores the claim that cold war politics have determined global relations since the Second World War and acted as the most powerful force in relations between nations.

Block 3 Technology, change and the global political order (5 weeks) Nuclear technology has been an important new element in great-power competition and the nuclear arms race a central feature of world politics. This block explores how far the arms race is driven by technology and then widens its scope to discuss the degree to which technology, as a force in itself, is transforming the nature of world politics. By examining the influence of nuclear power, communications, space and information technology upon the nature of world politics the block evaluates the role of technological progress as a powerful force for creating new global issues and intensifying an interdependence between states which can only be managed by establishing structures of international co-operation.

Block 4 A global economy? (7 weeks) Technological developments, while obviously important, have taken place within an economic framework and cannot be divorced from systems of economic production and exchange. How far have stronger international links been made through the formation of a world economic system? What is the nature of any such global economy and how far does it determine the nature and direction of international political development? Are the capitalist and communist worlds both part of a broader economic system? This block examines the notion of a global economy and explores its implications for international and domestic politics.

Block 5 Politics in a global society (7 weeks) Economic structures and technological forces have clearly played a large part in the formation of a more tightly-knit international system. Is the power of the state, therefore, being eroded or extended by growing interdependence? This block evaluates competing views about the emergence of a world society and the contemporary significance of the nation state in world politics.

Block 6 Research project (7 weeks) The research project is designed to enable you to choose a current issue or topic that interests you and write an extended (double) TMA, based upon your own research undertaken at residential school. The first five blocks supply the background and concepts you need in order to tackle individual topics for yourself. The residential school will provide facilities for personal library work and opportunities for tutorial and group activities on the subject of your choice, both with other students and with tutorial staff, as well as for reviewing the course material.

Block 7 Conclusion (1 week) A final review of the main concepts involved in the idea of global politics.

NOTES FOR PROSPECTIVE STUDENTS.

Recommended prerequisites [D102]/D103, D205, D208 and [D209]. The course is complementary to D308 and is designed to further the themes introduced by [D208] and [D209]. You are advised to take one or both of these second-level courses before beginning D312.

Assessment Six TMAs, including a project which counts as a double-weighted TMA, and the examination. Substitution can apply to one TMA but not to the project.

Cassettes There are seven audio cassettes linked directly to the blocks and project.

Residential school A one-week course-based summer school. See also Block 6 above.

Set book F. Halliday (1986) *The Making of the Second Cold War*, Verso (2nd edn.).

D314

RESTRUCTURING BRITAIN

Third level: full credit

This interdisciplinary course examines some of the important changes which have reshaped the structure of contemporary Britain and its place in the international system during the last twenty-five years. It asks whether a significant restructuring is under way and attempts to explain the changes that have occurred. The course should enable you to make a critical examination of different theories and relate them to the available evidence. It has three sections, on economy, society, politics and the state, and instead of traditional units there are three main course books and three readers, permitting you to read and assess some of the important articles and debates for yourself. The uneven geographical dimension of change is a point of attention throughout the course.

Content Britain has experienced a number of large economic, social and political changes during the last twenty-five years. Manufacturing industry and employment have suffered a sharp decline and Britain's share of world manufacturing exports has fallen sharply as manufacturing imports have risen. At the same time, the number of jobs in the service sector has grown rapidly. This has led some commentators to suggest that Britain has been de-industrialized and that we are now a 'post-industrial' society. There have also been changes in the structure of employment. Many skilled male jobs in manufacturing have disappeared, particularly in the inner cities and the older industrial regions, and there has been a rapid growth of part-time low-skilled jobs, many of which are held by women, as well as a massive increase in the level of unemployment. There has also been an increase in the number of 'white collar' office jobs and a decline in the number of manual workers, which has led some observers to suggest that the traditional working class is disappearing and that Britain is becoming a middle-class society.

These views are open to question, but it is clear that there have been significant changes in the economy, work, consumption and social structure of Britain. These economic and social changes, and their very uneven geographical incidence, raise questions about the changing form and geography of culture and politics in contemporary Britain. It has been suggested that there is a growing gulf between the affluent South-East and the rest of the country, between the poor inner cities and the wealthy suburbs, and that these 'two nations' of income and wealth, employment and unemployment, owner-occupiers and council-tenants, are reflected in a growing geographical division in party political alignment and voting. It has also been suggested that the post-war political consensus on housing, employment and the welfare state is dead and that we have entered a new era of market-oriented policies. At the wider international level, there are questions about the UK's changing relationships with Europe, with the USA and with the Commonwealth.

Taken collectively, these issues and changes raise the question of whether Britain has undergone a radical transformation in its economy, social structure, culture and politics over the last twenty-five years, and it is this question that the course considers.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [D102]/D103. It would be to your advantage to have taken at least one of the courses listed below.

Complementary and related courses [D202], [D204], D205, [D209], D211.

Assessment TMAs 02-07 (50%) and the examination (50%). Substitution can apply to one TMA. TMA 01 is formative and will not be used for assessment.

Cassettes There are two audio cassettes.

Preparatory reading You might find it useful to read some of the following: A. Gamble (1981) *Britain in Decline*, Macmillan; S. Lash and J. Urry (1987) *The End of Organised Capitalism*, Polity Press; R. Hudson and A. Williams (1986) *The United Kingdom*, Harper and Row.

Set books Three readers will be provided as part of the course material.

D345

ECONOMICS AND GOVERNMENT POLICY

Third level: half credit

This course is designed to increase your understanding of current issues in economic policy and to strengthen your ability to use economic theory. In D345, basic economic analysis is applied to important practical problems: from the abolition of domestic rates to the privatization of nationalized industries, from the problems of the National Health Service to the food mountains of the Common Agricultural Policy, from the reform of the tax and social security systems to the importance of the public sector borrowing requirement. Obviously, not only economic analysis is involved. D345 will show you how the application of basic economic analysis can clarify the problems and help to assess the different policies advocated by politicians, and others, to deal with them. But there is also an important political ingredient in these, and in the other matters considered in the course, and this too is taken into account.

Content There are four blocks in the course. The first, which you will be studying while the Chancellor prepares the annual budget statement, concentrates on the budget. We explain the procedures by which conflicting interests and economic pressures are combined in the budget presented to Parliament. You will see, for example, the significance of economic arguments over the PSBR, and why, particularly since 1979, the idea that the budget could be manipulated to reduce unemployment has been rejected by the government. Theories and arguments which lie behind opposing views of what the government should do to make the economy more efficient, and the outcome more fair, are discussed and drawn upon throughout the course. More than a quarter of government expenditure is undertaken by local government, so we also examine its role in the UK.

The second block is about taxation. Fundamental tax reforms are advocated by politicians in all parties. The characteristics of the present tax system, and some of the main criticisms of it, are outlined: and then various reforms such as changing personal income tax and introducing a poll tax to replace domestic rates are examined.

Block 3 examines government policy towards industry and agriculture. What is the real reason for the recent programme of privatization? What should the government's policy be (and what is it) towards monopolies and privatized industries? Can it successfully influence private sector investment decisions to improve the performance of the economy? You will also find a clear account of the Common Agricultural Policy, and see what alternatives are being considered in the EEC for its reform.

The last block concentrates on economic aspects of the welfare state. We examine the social security system and proposals for its reform, we look at the government's influence on the distribution of income and we explain the problems which have to be faced in deciding policies for the NHS. The last unit will help you to review and revise the course.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [D323].

Recommended prerequisites D345 was written with the assumption that you have already studied D210 or a similar course ([D222] and/or [D284]). If you are in any doubt about whether you are adequately prepared, please consult your tutor, counsellor, or the D345 Course Manager, Faculty of Social Sciences, Walton Hall.

Related courses This course complements others concerned with government or policy, for example (from the Social Sciences Faculty) D205, [D208], D211, [D324], [D355].

Students with disabilities Course and supplementary materials are not available on tape.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes Two audio cassettes and accompanying booklets help you to revise basic economic concepts and guide you through worked examples of some of the techniques used in the course.

Set books A. Gillie, R. Levacic and G. Thompson (eds.) *Politics and Economic Policy*, Hodder and Stoughton (course reader). J.A. Kay and M.A. King

(1989) *The British Tax System*, Oxford University Press (5th edn.). The current issue of *Public Domain* is available to D345 students at a reduced rate; details of how to buy it will be sent in the first course mailing.

D421

SOCIAL SCIENCES GUIDED STUDY COURSES

Fourth level: half credit

These courses are designed to enable you, at the end of your degree programme, to investigate certain topics within a more flexible guided study programme, thereby widening the range of topics which can be studied at the undergraduate level and allowing for an amount of specialization appropriate to an honours degree. The courses are built around prescribed reading, and you are expected to study more independently than at third level; you are also expected to show greater initiative in obtaining essential reading materials. All guided study courses are mounted from year to year and what is offered in a particular year will be decided in the previous year. No more than two of these courses may be studied.

At present we plan to present the following in 1992:

D437 *Conflict and change in the countryside*
D440 *Perspectives on revolution*

If you intend to register you should write for the leaflet 'Guided Study Courses', which gives details of the 1992 courses including objectives, course outline and guidance on books. It is available from the Central Enquiry Service, PO Box 71, The Open University, Walton Hall, Milton Keynes MK7 6AG, tel. 0908 653231.

NOTES FOR PROSPECTIVE STUDENTS

Course material The material for the courses comprises a course description, course guide, booklists and tutor-marked assignments; there are no printed units. There are no broadcasts and no residential school.

Conditional registration Because of the form of these courses and the method by which they will be taught, the number of students will be restricted to 25. The prerequisites are three post-foundation credits in the social sciences, or closely related credits, including one course at third level. Applications will be considered during the period of conditional registration; those whose combination of credits for a chosen course appears not to provide a suitable preparation will be advised by letter to reconsider their registration before the final date for conditional registration.

Note Students are not selected for these courses: the places are allocated according to usual OU procedures.

Tuition The courses are taught by members of full-time staff, and tuition is provided through correspondence based on the TMAs.

Assessment There is some variation between courses, but generally there are six TMAs (the substitution rule can apply to one) and the examination. Full details of the assessment strategy are given in the leaflet mentioned above. There are more TMAs than in other half-credit courses so that there can be more communication between tutors and students.

Students with disabilities If you have a visual handicap you may have some difficulty. Course and supplementary materials are not available on tape.

Set books There will be set books, and you may need to make extensive use of specified books and publications in your local library. Further details about set books can be obtained from the Central Enquiry Service (see above).

DE325

WORK AND SOCIETY

Third level: half credit

Last presentation 1992

Why is work designed as it is? How and why do jobs differ in security, conditions and status? Why and how does professional work differ from factory work? Why should we trust the professional person but not the car dealer? Work is one of the most significant things we do and tells us not only a great deal about ourselves as individuals but also a great deal, collectively, about the society in which we live and toil.

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Assessment T nation (50%). S

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Set books T containing artic course units: Cr Work, published (1984) Work, Open University

DE354

BELIEFS IDEOLO

Third level:

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What is work? Can and should non-paid work such as housework and voluntary work be regarded as work? Is criminal activity work? How are we to regard the 'black economy' or the paid 'official' work of the monarchy? The course reflects contemporary debates which challenge everyday assumptions about work and reveals how our 'common-sense' view of the concept of work proves to be riddled with inconsistencies.

The course will appeal to anyone who is interested in exploring these questions further and understanding how and why work is socially organized, and the consequences of this for our lives as well as for social stability and change.

Content The course is divided into four blocks. The first considers various types of work and the principles which these reveal, e.g. the nature of some work in non-European societies; the control of factory work; the cultural and gender construction of housework; the historical development of agricultural work; and the professional's claim to trustworthiness. To a considerable extent it establishes the agenda for the rest of the course.

The second block takes a wider view of what determines work design. Is it, ultimately, culture or modern technology which is responsible for work design? This question is explored through two detailed observations of work, in France and in modern China.

The third block is directly concerned with current trends within places of work: it considers the design of factory employment; the nature and determinants of the demand and supply of labour, and the differences in the ways in which employees are rewarded; the sources and consequences of conflict at work; and the factors that shape organizational structure.

The last block takes a broader look at the relationship between work and society by considering those aspects of society (education, the family, ideology) which serve to support and sustain current forms of work with all their inequalities and potential for conflict.

The course also contains three review units to allow you to catch up with your work if you have fallen behind, to reflect, in an organized manner, on some general questions which have been raised in earlier units but which might not have been directly treated, and to revise for the examination.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [DE351].

Recommended prerequisites We recommend that you should have studied one or more of the following courses: [D102]/[D103], [D207], [DE353], [DT200], [E205], [E333], [U221]. If you have not studied any of these prerequisites you are encouraged to read the unit material in advance, or a general preparatory text such as P. Worsley (1988) *The New Introducing Sociology*, Penguin.

Assessment TMA 01-04 (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes The television programme presents a survey of course themes and ideas. Audio cassettes provide further analysis of some important issues.

Set books Two specially prepared anthologies containing articles and excerpts to accompany the course units: Craig R. Littler (ed.) *The Experience of Work*, published by Gower; and K. Thompson (ed.) (1984) *Work, Employment and Unemployment*, Open University Press.

DE354 BELIEFS AND IDEOLOGIES

Third level: half credit

The course looks at some of the ways in which knowledge, beliefs and ideologies are bound up with social systems. This involves some consideration of different theories of ideology, and of power within society, but we concentrate mainly on case studies drawn from both historical and contemporary examples. We examine how ideas about, for example, religion and nationalism have been formed, and how they sustain or challenge existing social relations.

Content Most of the material is in three readers, with an introduction, conclusion and study guides to back them up.

The introduction outlines the questions to be covered in the study of beliefs and ideologies, and sketches in some of the main definitions of the concept of ideology.

The first reader examines the character of religious ideology, language and institutions, contrasting different forms of religion from the formal to the popular. It looks in particular at the dominant religious formations in nineteenth-century Britain, at the Rastafarian movement and its relationship to black consciousness, and at the place of religion in British society since 1945.

The second reader considers the relationship between ideology and political processes — the definition of 'the political' in terms of liberal democracy in Britain; the formation of the complex of imperialist and nationalist ideologies that fed into modern British Conservatism; and, as a contrasting case, the role of ideology in the making of Fascist Italy in the 1920s and '30s.

The third reader attempts to explore the role of particular institutions and agents in organizing social relations. It deals with the formation of specialized forms of knowledge about the family, sexuality, and schooling, and the use of such knowledge to categorize and regulate the population.

The conclusion provides a summary of the main themes and concepts developed in the course.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [D207]. We strongly advise that you should have studied one of the social science second-level introductory discipline courses, preferably (but not necessarily) [D207].

Complementary and related courses The course is one of three sponsored by the sociology discipline, the others being [D207], [DE325] and, from 1992, [D213]. Other related courses are [A203], [A309], [A315], [D209], [D308], [U203], [U221].

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes Three 90-minute audio cassettes extend the tuition of the course, enhance the teaching of theories of ideology and give guidance in the study of the more difficult course readings.

Set books Three readers, specially prepared for the course, contain most of the set reading. They are R. Bocco and K. Thompson (eds.) *Religion and Ideology*, Manchester University Press; J. Donald and S. Hall (eds.) *Politics and Ideology*, Open University Press; and V. Beechey and J. Donald (eds.) *Subjectivity and Social Relations*, Open University Press. You need buy only *Religion and Ideology*, as the other two readers will be supplied as part of the course material.

DSE202 INTRODUCTION TO PSYCHOLOGY

Second level: full credit

This course provides an introduction to psychology which is suitable for all students who have an interest in this area. It is a recommended prerequisite for those who plan to take a course such as D307 or D309. It is also an essential part of the set of psychology courses which is recognized by the British Psychological Society (see Section 1 of this publication).

The course introduces a wide range of approaches and methods in psychology. You will learn to evaluate the models, theories and techniques which are described and will acquire basic skills necessary for psychological research. A theme of the course material is the different ways in which psychology is applied in everyday life.

Content The course is presented in two volumes and is divided into eight parts, each dealing with a different set of approaches. Each part is accompanied by a television programme and has an associated assignment. There are also audio cassettes to expand some parts of the course.

Part 1 introduces some questions about the theory, methods and uses of psychology, which are outlined with the aid of television and audio cassette material.

Part 2 includes chapters on the development of self, child development and psychodynamics.

Part 3 is about the foundations of behaviour, and includes chapters on the biological bases of behaviour, learning and conditioning.

Part 4 looks at similarities and differences between people and includes chapters on intelligence, personality and the humanistic approach. There is also a project unit on personality.

Part 5 deals with the psychological processes involved in acquiring and making sense of information from the environment. It includes chapters on perception, attention and human memory. There is also a project on attention.

Part 6 contrasts the individual and social dimensions, with special reference to language, communication and aggression.

Part 7 examines the applications of psychology, and includes chapters on clinical psychology and autism.

Part 8 includes a review of the whole course.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [DS261], [DS262] which this course replaces.

Recommended prerequisite [D102]/[D103].

Complementary and related courses D102, D309, D307, [DE304], E206, E362. Please read the Recognition Information Leaflet about the British Psychological Society (see Section 1).

Assessment Eight TMAs (50%) of which three will be practical projects, and the examination (50%). Substitution can apply to two TMAs.

Broadcasts and cassettes There are eight television programmes dealing with the theme of 'Psychology in action' and including material about the work of psychologists, ranging from laboratory scientists to clinical therapists. Two audio cassettes include discussions by well known psychologists of the controversial issues in psychology.

Residential school A one-week course-based summer school giving you an opportunity to complete two projects of your own design in different areas of psychology — social psychology and memory research.

Students with disabilities If you have impaired sight you might need some help with the experimental project work.

Special features You will be expected to have access to a calculator, and a stop watch would be useful.

DT200 AN INTRODUCTION TO INFORMATION TECHNOLOGY: SOCIAL AND TECHNOLOGICAL ISSUES

Second level: full credit

It has been claimed that information technology will revolutionize our lives over the next decade, and yet how many of us really understand what IT is and what the nature of the supposed revolution is likely to be? How will IT affect you, your family, your workplace and our wider social lives? Debates, vital to our future, about such questions have arisen among many of the leading representatives of our society, and this course attempts to involve you in them.

DT200 is an inter-faculty course that explores some of the social and technological issues arising from the introduction of information technology into our everyday lives. Its aim is to enable you to make informed and critical judgements about these issues and to relate them to your own experience.

This is an introductory course, providing you with the necessary skills and background to proceed to a higher level or more specialized aspects of IT, and related technologies, in either technological or social contexts.

The course examines a number of matters associated with the implementation of IT, such as social and material inequalities, the distribution of power within and between societies, and the future of work. It explores the various arguments that have been advanced and gives you the evidence to enable you to make your own assessments. The course considers the social and technological processes involved in the use, control of and access to various forms of IT so that you can make informed judgements about its social implications.

You will be expected to spend about 20 per cent of your study time working with a home-based microcomputer system. This will enable you to develop practical skills in the use of IT systems for such applications as databases, document processing, financial models, electronic mail and computer conferencing. The software provided will also give you practical

experience of some of the different types of user-interface currently under development.

Content The course is presented in seven blocks, each taking about four or five weeks' study. Each block is centred on an IT application area and selected case studies are developed in a mainstream text. Specific knowledge or skills relating to technological or social aspects are treated in tributary texts. Another text supports the practical activities associated with each block.

Block 1 *People, technology and issues* surveys the main issues to be covered by the course. It also provides a brief history of computing and telecommunications and describes some of the new IT systems.

Block 2 *IT in the home* explores some of the IT systems that are available in the home and examines the role of families in the acquisition and use of IT.

Block 3 *IT in banking, finance and retailing* describes the role of IT in banking and retailing. Recent developments covered include Electronic Funds Transfer and Point of Sale technologies.

Block 4 *IT in education and training* considers how IT is used to assist the process of education and how individuals are trained to use it.

Block 5 *IT in manufacturing* looks at the application of IT within the UK manufacturing sector. Computer-integrated manufacture is considered as one potential strategy. The block discusses changes in the organization of companies resulting from the introduction of CIM.

Block 6 *IT and government* considers the attitude of government towards legislation and regulations that influence the development and use of IT. The social tributary provides an introduction to the important topics of ownership of information and copyright protection, and to questions about privacy, surveillance and data protection.

Block 7 *Conclusion: questions and issues* draws together many of the ideas raised in the course and shows how the social and technological viewpoints can be integrated to provide a more balanced analysis of the issues.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [D102]/[D103] or T102. No previous knowledge of IT is assumed and the necessary technological and social science skills are developed within the course.

Assessment Seven TMAs (50%), one associated with each of the first six blocks. You will also be required to complete a tutor-marked project about computer-assisted communications. The examination (50%). Substitution can apply to up to two TMAs from TMAs 01-05 and 07 but not to TMA 06.

Tuition Part of the tuition will be by electronic communication, offering electronic mail and computer conferencing facilities for communication both between tutor and student and between students.

Broadcasts and cassettes The sixteen television programmes are an essential part of the course, since many of the blocks use them to introduce the case studies. You should therefore make sure you have access to the programmes or to recordings of them. There are also eight radio programmes in which you can hear some of the leading figures in IT discuss the issues covered by the course. Audio cassettes are also provided.

Students with disabilities Visual handicap or impaired manual dexterity may prevent you from completing all of the practical exercises on the microcomputer.

Computing facilities You will need continuous access to a microcomputer that meets the specification of the University's home computing policy. See page 4.

A modem is included as a returnable home kit. It is used to connect to the OU ACS computer for part of the practical work and for tutorial conferences. You will need a new style BT jack socket for your telephone to use the modem and you will be paying the phone charges for connections made in this way.

Set books There is one set book: R. Finnegan, G. Salaman and K. Thompson (eds.) *Information Technology: Social Issues*, Hodder and Sloughton. This is a specially prepared reader containing selected papers dealing with the social aspects of IT.

SCHOOL OF EDUCATION

OVERVIEW

Courses in the School of Education are of interest and value to teachers and non-teachers alike. They cover a range of subjects and disciplines concerned with education both at school and beyond.

Are you a teacher?

If you are a teacher (or otherwise professionally involved in education), the inclusion of education courses in your first degree profile can serve a dual purpose. Not only do they provide you with a professionally relevant component in your degree, but they also open up opportunities for further study towards an advanced diploma and perhaps a master's degree in education.

Most education courses in the undergraduate programme also appear in the Part A section of the advanced diplomas available in the associate programme. You can count the same courses both towards your degree and the Part A requirements, and you can even choose to complete the advanced diploma before you finish your degree. There are advanced diplomas in four subject areas — Management, Mathematics, Special Needs, Technology — and a professional diploma in Post-compulsory Education. As each has different Part A requirements you will need to take account of these when choosing your undergraduate courses. The chart below summarizes the structure of the advanced professional development programme.

Successful completion of a good honours degree makes you eligible for admission to the MA in Education programme. An Open University advanced diploma also qualifies you for entry to the MA programme (whether you are a graduate or not) and exempts you from one of the three modules of the higher degree. So careful choice of courses in the undergraduate programme could put you on a ladder leading to more advanced, professionally relevant qualifications.

Or are you interested in education from another point of view?

If you are not a teacher but are interested in education we can offer lively and varied courses with which to enrich your degree profile. Students embark on education courses from different backgrounds within the University. As the School has no foundation course, no assumptions are made about what you have already studied. Our second-level courses are accessible to all students, whatever subjects they have taken before, and they are all suitable for study straight after foundation level.

Do you want to become a teacher?

If you want to construct your degree profile so as to improve your prospects of entering teaching, how you do this will depend on the age group you wish to teach, your subject specialism and the course of initial teacher training you want to take. With few exceptions, entry into teaching in schools follows a Postgraduate Certificate of Education (PGCE) course or a Bachelor of Education (BE) degree through which you gain qualified teacher status (see Recognition Information Leaflets 1.1 and 1.2). Before you reach this stage you will probably want to build up a coherent degree in one or two subject areas, but this should not prevent you from taking some carefully chosen education courses as well. For example, you might wish to anticipate your teacher training by taking a general course such as E208 *Exploring educational issues*, E206 *Personality, development and learning* or E271 *Curriculum and learning*. Or you might want to look ahead and take advantage of the fact that several of our more specialist courses also count towards advanced diplomas (see above).

Still, before you make any decisions, it would be wise to seek advice about entry requirements from an institution that offers teacher training courses or from the Graduate Teacher Training Registry. The Open University has produced a booklet called *Entering Teaching*, tailored to the interests of OU students. You can get a copy by writing to the Central Enquiry Service, The Open University, PO Box 71, Walton Hall, Milton Keynes MK7 6AG. A few institutions are

developing part-time PGCE courses, most of which last two years and are concentrated in subject areas in which there is a shortage of teachers. Several of these courses are run in collaboration with the Open University and incorporate EP228 *Frameworks for teaching*, which is available in the associate programme only but can be transferred as a half credit towards the BA degree.

Choosing a course

In the summaries below we give some indication of how education courses might link into particular degree profiles. These suggestions are only a starting point, and you will need to read the individual course descriptions to see how these courses might relate to your interests and plans.

Full-credit courses

There are three full-credit second-level courses that are particularly well suited to the earlier stages of a degree. E208 *Exploring educational issues* offers a view of a wide range of topics in contemporary education, both in and out of school. It is of interest to anyone who has a concern for current educational issues as parent, teacher, school governor or citizen. The course draws particularly on the language and concepts of the social sciences and would be a valuable and up-to-date education contribution to a degree profile going in that direction.

E206 *Personality, development and learning* is about developmental and educational psychology and is an important part of the set of courses recognized by the British Psychological Society as the equivalent of a degree in psychology (see Section 1). But whether included in that set or treated as a single course, it provides a lively introduction to the fascinating field of child development and serves as a preparation for the third-level course E362 *Cognitive development*.

EH207 *Communication and education* is a study of human communication which draws on a variety of traditions not only from the language area but also from media and communications studies. It has a broad appeal and is particularly appropriate for those who have interests in art

and social sciences.

Half-credit courses

There are several half-credit courses at second level, two of which will be presented for the first time in 1992. E242 *Learning for all* is a course for anyone with an interest in the education of children and young people who experience difficulties in learning in schools and colleges or who have disabilities. It encourages you to analyse and criticize educational practice and the literature concerned with difficulties in learning. You can be inside or outside teaching, and your particular interest can be in nursery, primary, secondary or further education or in mainstream or special schools. It is a compulsory Part A course in the Advanced Diploma in Special Needs in Education. EM236 *Learning and teaching mathematics* is for students who are directly concerned with the mathematical education of children between the ages of 5 and 16. It is likely that many will be practising teachers, but if you have regular and frequent access to children in that age range you will be able to take the course. Its aim is to support effective and continuous professional development in mathematics education as the national curriculum and new assessment requirements are introduced throughout the 1990s. It is one of the Part A courses in the Advanced Diploma in Mathematics Education.

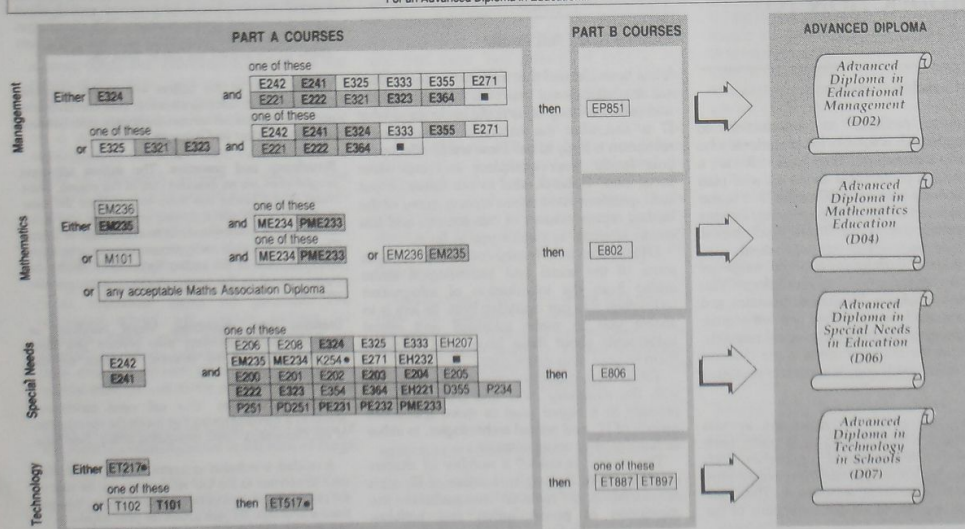
E271 *Curriculum and learning* gives an informed and up-to-date account of aspects of school life which are undergoing significant change, and so is of great interest to both teachers and parents. EH232 *Computers and learning* looks at the ways in which computers affect learning in all areas of the curriculum and at all stages of the education system.

All of the half-credit courses at third level tend to look at defined areas of enquiry more closely and in greater depth. Although few of them have recommended prerequisites, they require a more independent kind of study which makes them better suited to the later stages of a degree profile.

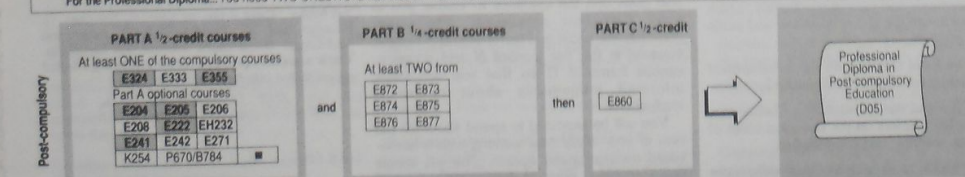
In the area of educational management, E325 *Managing schools* examines the theory and practice of school management from the points

SCHOOL OF EDUCATION ADVANCED PROFESSIONAL DEVELOPMENT PROGRAMME 1992

For an Advanced Diploma in Education...



For the Professional Diploma... You need TWO CREDITS: a half credit in Part A, a half credit in Part B and a half credit in Part C, and another half credit from Part A or Part B



Notes Courses in bold appear in more than one diploma. (You may count a course towards a maximum of two diplomas or one diploma and a BA.) Courses with a grey background have been discontinued but will still be counted.

Advanced standing may be awarded for any acceptable non-OU course.

These, and any course whose number begins with 8, are available only in the associate programme.

of view of both the manager and the managed. It has an important place in Part A of the Advanced Diploma in Educational Management, and 1992 is its last year of presentation in its present form.

E333 Policy-making in education helps you to understand the context within which educational policies are created. It is related to the educational management courses (and is in Part A of the Advanced Diploma in Educational Management) and fits well with social science courses on policy-making and sociology. It is also a Part A course in the Professional Diploma in Post-compulsory Education. It will be presented for the last time in 1992.

E356 'Race', education and society is a guided reading course based on three course readers. It analyses the relationship between racial inequalities and other kinds of social division in education, as well as the relationship between racial inequalities in education and in other areas of social life. So it combines well with a variety of social science and 'U' courses to do with policy-making and equality of opportunity. It is a Part A course in the Advanced Diploma in Special Needs in Education.

EH266 Learning through life is scheduled for presentation in 1993 as a replacement for E355. It will be a Part A course in the Professional Diploma in Post-compulsory Education.

E362 Cognitive development looks in more detail at some of the areas of development psychology first visited in E206 *Personality, development and learning*. Like E206, it is one of the courses recognized by the British Psychological Society.

What to do now

In this 'overview' we have tried to give you a brief introduction to the School of Education's courses. More detail is provided in the descriptions that follow. If you want further advice or information, please ask the School of Education staff tutor at your local Regional Centre.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and presentation dates are listed in Table III.

E206 PERSONALITY, DEVELOPMENT AND LEARNING

Second level: full credit

How can psychological enquiry help us to understand how human beings develop, how we learn and how our personality is formed? What are the implications for the way we lead our lives and the way society educates its children? These questions introduce key ideas in educational psychology.

The course draws on your own experiences and examines learning beyond schools and classrooms, so it is of interest to non-teachers as well as to teachers.

Content

The *Introduction* explores your own perceptions of psychological knowledge as a way of understanding human development and behaviour and introduces some diverse explanations proposed by psychologists.

Block 1 Human development examines how we develop and what significant influences there are. Development, here, is studied from several different points of view, particularly the work of Piaget. We consider the educational significance of play and the importance of parent-child relationships for children's emotional and intellectual development.

Block 2 The nature of learning How do we learn, remember and act intelligently? How do we learn our mother tongue? How do we learn to read and understand mathematical concepts? These are some of the questions considered in this block.

Block 3 Personal and social development Here the direction changes to the description and evaluation of theories of personality and self. There follows an analysis of how we form opinions and judgements about

one another and how accurate these are. Some practical implications of this work are to do with children deemed maladjusted at school.

Block 4 Psychology in practice Here we concentrate upon the significance and adequacy of psychological interpretations of educational success and failure, examining why some people in our society fail to become literate, why black children are less successful in schools than white children, how girls can become better mathematicians and what are the needs of the dyslexic child.

Revision and future issues Finally the main themes of the course are drawn together and some structured revision is provided.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [E201] and [E281].

Complementary and related courses E206 is one of the set of psychology courses making up a degree recognized by the British Psychological Society. It is a useful preparation for E362 and it complements DSE202/ [DS262]. See Section 1.

E206 contributes to Part A of the Advanced Diploma in Special Needs in Education. You can apply to count a credit in E206 towards this award in the associate programme.

Assessment (i) TMA 01, 03, 05, 07 (28.6%); (ii) project TMA 02, 04, 06 (21.4%); (iii) examination (50%). Substitution can apply to one TMA from each group. Of the seven assessed TMAs, three are based on guided project work spread over the four central blocks of the course (time has been allowed for collecting data). Choices will be available for these TMAs to meet the needs of students with disabilities and those studying under restricted conditions.

Broadcasts The twelve television broadcasts are integrated with the course texts.

Cassettes Four audio cassettes complement the four blocks of the course.

Students with disabilities See 'Assessment' above.

Set books There is a course reader, P. Barnes *et al.* (eds.) *Personality, Development and Learning*, Hodder and Stoughton, and two set books: R. Schaffer, *Mothering*, Fontana, and M. Donaldson, *Children's Minds*, Fontana. You will need all three books at the beginning of the course.

E208 EXPLORING EDUCATIONAL ISSUES

Second level: full credit

This is a broadly based, multidisciplinary course intended for all those interested in education, whether professionals in the area or not. By the end of the course you should be able to:

- Apply social scientific method and theories to educational issues.
- Evaluate various forms of educational enquiry and evidence.
- Analyse teaching and learning methods.
- Understand the main bases on which the education system and schools are organized and financed.
- Understand some of the factors associated with different educational provision and achievement.
- Understand how informal educational agencies such as the family, peer groups and neighbourhood work.
- Review the main arguments about the relationships between education, training, work and unemployment.

Content The course progresses from child to adolescent to adult, from family to school to work, from the individual to social structure. Prominent themes are myth and reality in education; the tension between formal and informal processes of education; the relationship between an individual's concerns and wider matters. There are seven blocks:

- 1 Introduction
- 2 Family and School
- 3 Teaching and Learning
- 4 The Organization of Schooling
- 5 Equality in Education
- 6 Work, Non-Work and Education
- 7 The course review

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [E200], [E220], EP228 (available in the associate programme only; see Section 5 for further information).

Recommended prerequisite Any foundation course.

Complementary and related courses E208 replaces [E200] and [E205], though the latter is not an excluded combination. As an introductory course, E208 relates to all of the School of Education's undergraduate courses. You could go on from here to more specialist courses at both second and third levels. As a general issue-based course it would also be useful in providing an educational perspective in any combination of courses.

Assessment Seven TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts Fifteen television programmes closely linked to the correspondence texts. The seven radio programmes take the form of bulletins to keep you in touch with the most topical issues, and will be remade each year to keep the course up to date. If you have no access to television or radio you will be at a disadvantage.

Cassettes There are seven audio cassettes, each linked with the correspondence texts.

Set books M. Woodhead and A. McGrath (eds.) *Family, School and Society*, Hodder and Stoughton (course reader). B. R. Cosin and M. Flude (eds.) *School, Work and Equality*, Hodder and Stoughton (course reader). J. Statham, D. MacKinnon, H. Cathcart and M. Hales *The Education Fact File: A Handbook of Education Information in the UK*, Hodder and Stoughton (2nd edition).

E242 LEARNING FOR ALL

Second level: half credit

Learning for all is a course for anyone with an interest in the education of children and young people who experience difficulties in learning in schools and colleges or who have disabilities. It will give you a comprehensive picture of how schools respond to difficulties in learning and how their responses are linked to local and national policies. It encourages you to analyse and criticize both educational practice and the literature to do with difficulties in learning, including this course. Its purpose is to engage you in a dialogue, whether you start from inside or outside teaching and whether your particular interest is in nursery, primary, secondary or further education or in mainstream or special schools.

Units 1 and 2 introduce the concerns of the course and the possibilities for starting critical enquiries in your own area. Units 3 and 4 challenge you to evaluate your own experience and to learn from that of others — pupils, parents, professionals and adults with disabilities — drawing together the fruits of both experience and research. Unit 5 is about education for under-fives and the possibilities of providing integrated education and social services for pupils with and without disabilities. Unit 6 examines various content areas, teaching and learning styles and educational settings in order to explore the relationship between school curricula and the difficulties pupils experience. Unit 7 looks at changing ideas about special curricula for groups of pupils — those who are slow to read, those who are deaf and blind, and pupils said to be autistic or have severe learning difficulties. Unit 8, looking back over the previous two units, asks how far differences between students require differences in teaching approaches. Unit 9 gathers together activities to help you analyse accounts of policy, practice and provision of special education. Units 10 and 11 are about disaffection, disruption and discipline. They explore relationships between pupils, their experience of bullying and the connections between disaffection and pupils' sense of their own worth. Unit 12 is about further and higher education and the opportunities for adults who have experienced difficulties in school or who have disabilities. Unit 13 continues the development of critical reading, particularly about integration and segregation.

The last three units of the course are about educational policy: conflicts of policy, the history of special education, the development and effects of legislation, the connections between special and mainstream schools and the creation of structures to include all pupils within the mainstream.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [E241].

Complementary and related courses If you wish to build on E242 to acquire the Advanced Diploma in Special Needs in Education, look at the courses on the chart on page 30 which form the second half credit for Part A of this diploma.

Assessment (i) TMA 01 (not assessed); (ii) TMAs 02-05 (12.5% each); (iii) the examination (50%).

Broadcasts and cassettes Eight television programmes and four one-hour audio cassettes.

Students with disabilities Alternative versions of audio and visual material will be provided if possible. Course and supplementary materials and the two readers will be available on audio tape in 1993 (the second year of presentation).

Preparatory work You could start a local and national education cuttings file, and you are encouraged to read outside the course material.

Set books You will need to buy course readers.

Special features You must have the use of an audio cassette player, and a video recorder would be helpful.

E271 CURRICULUM AND LEARNING

Second level: half credit

This course, presented for the first time in 1991, explores educational issues that have aroused widespread interest and controversy in recent years. How can children's capacity to learn be extended? How can new developments and research in cognitive psychology be made relevant to learning? What are the origins and characteristics of the national curriculum in England and Wales and how they can be compared with the Scottish and Northern Irish context? What is the evidence about standards? What constitutes an effective school? How do other countries organize their curriculum? These are some of the questions raised.

No previous knowledge is required and the course is suitable for all those who have an interest in the area. Parents and governors, for example, will find it a valuable account of many of the significant educational issues of the day. Teachers and lecturers will find it a good way to keep up to date in a world of rapidly changing policy and research.

Content The course is divided into three parts: (i) learning, (ii) how successful teaching and learning can be assessed, and (iii) how schools and other educational institutions can be judged and evaluated.

Many case studies are provided both in the text and in the accompanying television series. Each part of the course has a theme that raises general questions about the social and political context of schooling in the 1990s. These include the integration of children with special educational needs into mainstream schools, the debate about the teaching of history and the core subjects of English, mathematics and science, and the effect of equal opportunities policies on the school curriculum. Comparative material examines schooling and education in Japan and a selection of European countries.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [E203], [E204], [E283].

Complementary and related courses E271 is an introduction to the study of curriculum and learning and therefore relates to all the School of Education courses; other courses at second and third level would complement it. E271 is part of both the Advanced Diploma in Educational Management and the Advanced Diploma in Special Needs in Education (see Section 5).

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Eight television programmes and four audio cassettes.

Students with disabilities Course and supplementary materials are available on tape.

Set books Four readers.

E325 MANAGING SCHOOLS

Third level: half credit

Last presentation 1992

The effectiveness of schools has become a topic of great interest to the general public as well as to professionals in our schools and its importance is reflected in the provisions of the 1988 Education

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Reform Act (ERA). This course looks at the contribution management makes to the way schools perform, drawing on the most recent research into school management. Management has become a priority in in-service training as a result of the findings of HMI Reports, other official publications and numerous research projects; this priority is also demonstrated by the importance given to management qualifications for promotion to posts in middle and senior management in primary and secondary schools, and by the establishment by the DES of a task-force for the training of senior managers in our schools. All this has taken place in a context of reduced material and staff resources, affecting the morale and motivation of teachers at a time when schools are being closely scrutinized and appraised by parents, employers and society in general. The ERA itself has serious implications for the management of our schools. So the importance of management and leadership at all levels of school life is being stressed.

E325 is designed to be in the vanguard of thinking about school management and has been brought up to date to take account of the ERA. It has a practical approach in its emphasis on the interrelationship of theories, practices and skills in school management. It is intended for teachers and others involved in school management, including governors and parents, and shows how theoretical approaches and recent research can contribute to our understanding of real situations in primary and secondary schools. The course uses case-study material extensively in order to ground the discussion of management theory and practice in realistic school settings. Many experts have contributed to the course.

- The aims of the course are to:
- Increase your knowledge of management processes in schools and to stress their importance in meeting pupils' educational needs.
 - Demonstrate the relevance of various theoretical approaches to management practice.
 - Develop an awareness of the need for a practical understanding of management activities and the special significance of the tasks, styles, strategies and skills of leadership in school.
 - Integrate theory with your own experiences of management and enhance your identification with practical management situations in primary and secondary schools through representative case studies.
 - Show the relevance of management to the curriculum and to pupils' welfare.
 - Discuss the deployment, selection and development of staff and the use of other resources.
 - Assess the nature of school effectiveness in relation to change.
 - Analyse the main external factors which affect the management process in schools.

E325 counts towards the Advanced Diploma in Education Management (see Section 5).

Content The course is divided into seven blocks. Block 1 examines the relationship between the practice and theory of school management, using case studies of a primary and secondary school. Block 2 looks at leadership, decision-making and effectiveness in schools and the key management roles of staff. Block 3 turns to the area of managing students and seeing how their academic, social and personal needs can be met by those who manage the curriculum, and the effect this has on behaviour and on curricula. Block 4 is about managing teaching and non-teaching staff, looking at careers in teaching and management, the selection, development and appraisal of staff, and ways of dealing with problems in personnel management in schools, including handling conflicts, understanding group behaviour (e.g. meetings), self-management (e.g. of stress and time), and the management of teams. Block 5 analyses the internal management of finance and other non-staff resources, including the use of information technology to meet curricular and management needs. Block 6 investigates the management of external relations in different types of school, taking into account socio-economic variables and the many external agencies which impinge on schools, within the framework of consumerism and accountability. Finally Block 7 discusses the role of management in effectiveness and change in schools.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [E321], [E323].

Complementary and related courses We hope that you will have a basic understanding of the structure and operation of the British education system. E333 would provide a helpful introduction. [E324] is a 'partner' course to E325, covering management in the post-compulsory sector.

Assessment Four equally weighted TMAs spread throughout the course (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Most of the eight television programmes and the two one-hour audio cassettes are associated with the case studies of school management. There are also two radio programmes which include introductory and updating material.

Students with disabilities Course and supplementary materials are not available on tape.

Set books A course reader, R. Glatter et al. (eds.) *Understanding School Management*, Open University Press, prepared by members of the course team, which is used throughout the course. S. Maclure (1989) *Education Re-formed* (second edn.) Hodder and Stoughton.

E333 POLICY-MAKING IN EDUCATION

Third level: half credit

Last presentation 1992

This course will enhance your understanding of the emergence, development and implementation of educational policy by:

- Examining the importance of the historical, social and political context for educational policy initiatives.
- Explaining and discussing different points of view on educational policy-making illustrated by case studies.
- Requiring you to apply the chosen analytical approaches to the examination of a policy issue within a structured project.

E333 contributes to Part A of the Advanced Diplomas in Educational Management and in Special Needs in Education and the Professional Diploma in Post-compulsory Education.

Content The course has a core of five modules of main text, with additional printed material and four readers.

Block A General policy-making

Module 1 Introducing educational policy introduces a wide range of theoretical approaches and explanations about how educational policy comes to be made.

Module 2 The policy-makers: local and central government These two main groups of policy-makers are introduced: central government through the DES and civil servants; and local government through LEAs and interest and pressure groups (teachers, parents and governors). The relationship between the DES and other government departments is examined, as are the effects of change in local political control on important policy areas.

Block B Examples of educational policy

Module 3 Industry, vocationalism and employers' needs describes the historical background to and development of educational provision for workforce training, looking particularly at the tensions between the academic and vocational elements of the school curriculum. It considers in detail the recent developments in post-16 education and training and the growth of youth unemployment.

Module 4 Race, gender and education policy-making deals with the emergence of questions of race and gender inequality in education and how they have been tackled through a variety of policy initiatives. The main problems of carrying out policy are examined through examples of attempts to change it.

Module 5 Curriculum and policy-making Here it is argued that what is taught and how it is taught are essentially political decisions. The national curriculum and its programme of testing are analysed in terms of the policy principles they reflect and the centralization of policy-making.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [E222].

Assessment (i) TMA 01 (13%); (ii) TMA 02 (13%); (iii) TMA 03 (10%); (iv) TMA 04 (14%); (v) examination (50%). Substitution can apply to one TMA, but not to TMA 04.

Broadcasts and cassettes Four television and two radio programmes, and two audio cassettes.

Set books M. Arot (ed.) *Race and Gender: Equal Opportunities Policies in Education*, Pergamon Press.

R. Dale (ed.) *Education, Training and Employment: Towards a New Vocationalism*, Pergamon Press. I. McNay and J. Ozga (eds.) *Policy Making in Education: The Breakdown of Consensus*, Pergamon Press. R. Moore and J. Ozga (eds.) *Curriculum Policy*, Pergamon Press.

E362 COGNITIVE DEVELOPMENT: LANGUAGE AND THINKING FROM BIRTH TO ADOLESCENCE

Third level: half credit

This course should enable you to:

- Survey and evaluate theoretical approaches to the study of child development and related methods and results.
- Describe the main changes in performance and learning potential during the course of individual development.
- Examine and evaluate situations which influence cognitive development, both within and outside the school context.
- Structure such situations in order to promote cognitive development and learning.

Content

Block 1 Cognitive development in infancy includes a discussion of genetic and environmental factors in development and how infants learn and perceive the world.

Block 2 Language development covers research into the process by which children develop language ability.

Block 3 Cognitive development to adolescence is about research into the development of abilities up to the start of adolescence.

Block 4 Cognitive development in adolescence deals with the transition into adult modes of thought, examining changes in cognition in the period 12-16 years.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [D102]/[D103] or [D502]/[D562] or E206. Certain areas of knowledge are required: the most important of these is a basic understanding of descriptive and analytical statistics used in the social sciences, psychological research methods and Piagetian concepts. These will have been adequately covered if you have successfully completed one or more of the courses listed above.

Recognition by British Psychological Society E362 may be taken by students who wish to obtain recognition of their degree by the British Psychological Society. See Section 1.

Assessment TMAs 01-03 (Blocks 1 to 3) (37.5%); TMA 04 (12.5%) is a compulsory report on the project; the examination (50%). All TMAs are equally weighted; there is a threshold of 40% for TMA 04 (which is not substitutable); substitution can apply to one of TMAs 01-03.

Project All students collaborate in a course project which involves work with at least two children aged 4-8 years. Collected data are pooled centrally and partially analysed. You receive these data and analyses and complete a final analysis and report (TMA 04).

Broadcasts and cassettes The seven television programmes and four audio cassettes cover several areas not extensively dealt with elsewhere in the course. Colour TV would be an advantage.

Students with disabilities If you have impaired vision, speech or hearing you may find difficulty in adequately completing the project work. As work with children will be necessary, those whose mobility is restricted may have problems unless they can arrange easy access to their subjects.

Preparatory reading You could begin to read one or more of the course readers. Another useful book that relates to much of the course is M. Donaldson (1978) *Children's Minds*, Fontana/Open Books.

Set books Each of Blocks 1-3 has its own associated reader, which is a central part of the course. 1: J. Oates and S. Sheldon (eds.) (1987) *Cognitive Development in Infancy*, Lawrence Erlbaum. 2: A. Locke and E. Fisher (eds.) (1984) *Language Development*, Routledge (2nd edn.). 3: K. Richardson and S. Sheldon (eds.) (1988) *Cognitive Development to Adolescence*, Lawrence Erlbaum.

ED356 'RACE', EDUCATION AND SOCIETY

Third level: half credit

ED356 attempts to balance the broad intellectual demands of a third-level course with the particular needs of professionals in the field of education. It draws out underlying theoretical and contextual themes and relates them to policy and practice. It analyses the relationship between racial inequalities and other types of social division, such as those based on class and gender, and the relationship between racial inequalities in education and other areas of social life, especially employment and social welfare. It also introduces debates about cultural identity and difference.

Content This is a guided reading course which develops the skills of independent study. It is in three main blocks, each presenting a different approach, with an introduction and conclusion.

The course introduction provides a critical survey of notions of 'race' and racism. It also discusses questions of racism and education in relation to wider debates about the political, economic and cultural context of education.

Block 1 Racism in education analyses national, local, and school-level policies and processes of change in the area of multicultural and anti-racist education. It discusses the assumptions and approaches of different agents in the policy process; accounts of community involvement; assessments of what has been achieved; and the scope of personal, professional and institutional change.

Block 2 Culture, identity and difference examines historical and psychological processes of boundary-formation between social categories. It shows how concepts like 'community' and 'ethnicity' are being re-evaluated in the light of intellectual and political developments.

Block 3 Racism, inequality and education looks at equal opportunities and racial discrimination in British society. It identifies the main forms of racial inequality in education and sets them in the context of racial inequalities in other types of institution, especially in the spheres of employment, welfare and the law.

The course conclusion reviews the main themes of the course and draws out their significance for an assessment of the possibilities and limits of educational attempts to challenge racism.

Although Asian and Afro-Caribbean minority communities are the main point of reference, comparisons are made to the position of other ethnic minorities. The course also discusses the formation of the dominant white culture, and the values and assumptions which have informed important educational developments.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [E354].

Complementary and related courses A228, [D202], [D207], D211, D314, DE354, E208, [E241], E271, [U204], U207, U208, U221.

Assessment Four TMAs and the examination.

Broadcasts and cassettes Eight television programmes and three audio cassettes.

Set books There are three course readers, one of which is provided as part of the course material.

EH207 COMMUNICATION AND EDUCATION

Second level: full credit

Last presentation 1992

EH207 is a study of human communication with particular reference to teaching and learning. It examines many of the questions that have informed the development of the national curriculum and so is of particular relevance to educators, but it is also of interest to others who wish to pursue the study of language, media and communication. The course's topics include language variation, language learning and

teaching, communication skills, communications media, communications networks and policy-making for language and communications in education.

Content The course is divided into an introductory unit and ten blocks.

Introductory unit A short introduction, built on a television case study, exploring the nature and diversity of human communication.

Block 1 Language and communication examines the structure and functions of human language as one among many communication systems and investigates how people use these systems in combination to produce and interpret meanings.

Block 2 Language variation looks at how language varies — between speakers and, even in the speech of the same speaker, from one situation to another. We also discuss language and social identity: how people judge others on the basis of their accent or dialect and how, in turn, language can be an important signal of the social groups speakers belong to.

Block 3 Language and inequality examines how social inequalities are reflected in language and also how, arguably, language may help to sustain them. We have chosen three topics through which to explore this theme: conversation and control; bias in language; and the development of the standard form of English.

Block 4 The development of communication examines how children learn to use language and other forms of communication. How does early language develop, for instance? How do children in this culture learn to be literate? Do different kinds of pre-school and out-of-school experience affect children's linguistic development?

Block 5 Communication and teaching looks first at teaching language in schools. Most children are competent language users by the time they come to school. How do schools build on this knowledge? Or is there sometimes a conflict of interests between home and school? Does reading need formal instruction, or can it be 'caught like a cold'? We look also at communication between teachers and children (and the occasional misunderstandings that occur). Finally, we examine formal and informal attempts to extend adults' communication skills.

Block 6 Communication, media and society examines the role of mass media in society (including questions of stereotyping and bias) and how one can analyse the effectiveness of communication through different media. You will also explore different methods used for media analysis.

Block 7 Literacy and the print media looks at the growth of literacy, and at uses and problems of literacy and contemporary society. We consider the relationship between literacy and formal education, and also of the influence of the new (non-print) media. We go on to consider text design and how this contributes to effective communication.

Block 8 Media for education tackles matters such as the role of educational broadcasting, the place of media education, and the relationship between the different media, their distinctive symbol systems and how different people learn from media. We also examine the consequences of new technology such as the microcomputer.

Block 9 The social organization of communication looks at professional communication and factors in communication within and between social organizations and groups. It explores the implications for communication in

education, examining two topics: the dissemination of specialized information and the role of communication in organizational innovation.

Block 10 Language, communication and the state considers national (and local) policies that affect language and communication in education. As a point of comparison with Great Britain, we also examine the effects of formal communication policies in a developing country (Samoa) and a developed country (Canada).

NOTES FOR PROSPECTIVE STUDENTS

Assessment Eight TMAs (50%) and the examination (50%). Substitution can apply to up to two TMAs.

Broadcasts and cassettes There are twelve television programmes, three of which are particularly suitable for recording on video for later analysis. We also use audio cassettes as an important teaching device. These audio-visual components provide case studies and other illustrative material as well as material for analysis. There are also two radio programmes.

Students with disabilities If you have a severe hearing or visual impairment you may be at a disadvantage. Transcripts are not available for one of the audio cassette bands, illustrating the sounds of English. Some of the television programmes are closely integrated with unit texts and two programmes provide material for further analysis.

Set books There are two course readers: O. Boyd-Barrett and P. Braham (eds.) (1987) *Media, Knowledge and Power*, and B. M. Mayor and A. K. Pugh (eds.) (1987) *Language, Communication and Education*, both published by Croom Helm; and a specially written 'method book' for the first half of the course: D. Graddol, J. Cheshire and J. Swann (1987) *Describing Language*, Open University Press. The other set books are A. W. Bates (1984) *Broadcasting in Education: an Evaluation*, Constable. P. M. Greenfield (1984) *Mind and Media: The Effects of Television, Computers and Video Games*, Fontana. P. Trudgill *Sociolinguistics: an Introduction to Language and Society* (revised edn.), Penguin.

EH232

COMPUTERS AND LEARNING

Second level: half credit

This course is about learning, not about computers. It is about how computers can help or sometimes hinder the learning of subjects in all areas of the curriculum and at all stages of the educational system.

The course looks at the learning process and the ways in which computers affect it; how curricula are developed and controlled, how information technology affects the role of the teacher or educator, how the computer can promote, enhance or interfere with learning. The methods of analysis used are historical, socio-political, evaluative, theoretical and through case studies. Topic areas used in illustrative examples include mathematics, science, language and humanities.

We will give you experience of using selected educational applications; help you understand how social and political contexts influence the use of computers in education; give you experience in analysing and evaluating particular programs; and relate research into learning, cognition and communications to the use of computers in education.

Content The three parts of the study year are

as follows (the middle section is the longest to allow extra time for project work):

Learning through computers Here you explore the contribution computers can make to learning in particular topics, with a small project as a first assignment.

Computers, cognition and communication This part covers the use of computers in relation to current theories of learning and communication. There are two assignments, one of which includes practical project work with a group of learners.

Computers and learning in practice You will examine the possibilities and limits of four ways of using computers in education — with hypertext, with a microworld, for special education and through computer-mediated communication. You can choose one of these on which to base your last assignment.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [EH221].

Recommended prerequisites You should have basic familiarity with your microcomputer, which must meet the Open University specification (see page 4). You should know how to format and copy disks and how to install and use software.

Complementary and related courses DT200, D309, DSE202, E206, [E241], T102.

Assessment Four TMAs and the examination. Substitution will not be allowed for the project-related assignments (TMA 02 and TMA 03).

Cassettes One 105-minute documentary video; one 120-minute video of observation data. Two 90-minute audio cassettes.

Computing You must have easy and regular access to a computer that meets the specification of the University's home computing policy. Dual disk drives, or a hard disk, would be more convenient for this course. If you already own a modern you can continue to use the computer conferencing facility on the University mainframe computer. There will be several disks of educational software and a pack, 'T520: Introduction to MSDOS and Framework 2', will be provided. This contains software, print and audio cassettes.

Students with disabilities There is a lot of practical work: using a keyboard, sometimes guided by audio cassettes; video for observation work; project work with learners. Impaired eyesight or manual dexterity might prevent you from completing all this practical work. Course and supplementary materials are available on tape.

Preparatory work You should make yourself familiar with the computer if it is new to you.

Set books A reader is provided with the course units: O. Boyd-Barrett and E. Scanlon (eds.) *Computers and Learning*.

Special features You will need access to a small group of learners (of any age) at stages of the course

EM236

LEARNING AND TEACHING MATHEMATICS

Second level: half credit

EM236 is intended for students who are directly concerned with the mathematical education of children between the ages of 5 and 16. It is likely

that many will be practising teachers, but others who can have regular and frequent access to children in that age range will also be able to take the course. The main aim is to support effective and continuous professional development in mathematics education as the national curriculum and new assessment requirements are introduced throughout the 1990s.

In more detail, the course should enable you to:

- Explore the characteristics of mathematical thinking.
- Study the development of important mathematical ideas in schoolchildren.
- Support approaches to teaching mathematics which will build on children's existing knowledge and understanding.

The course provides a variety of study materials through which to examine the processes of teaching and learning mathematics. An important starting point is your own experience of the classroom. You will be asked to initiate and observe mathematical activities with children and, with the aid of text, video and audio materials, to reflect on and analyse them. From these very practical beginnings the course identifies and considers the issues which are most likely to affect the work of primary and secondary teachers of mathematics in the 1990s.

We examine those aspects of mathematics which make it distinctive, and which can also make it challenging or frightening to some learners, and go on to look at the variety of roles played by learners and teachers in the classroom. A particular point of emphasis is the management of controlled change in the mathematics classroom: we consider forms of classroom organization and management which enable teachers to offer rich and challenging activities while maintaining awareness of individuals' mathematical progress.

The tension between the problems of maintaining a detailed curriculum and those of adapting its presentation in the light of pupils' individual needs are explored and the course offers you practical help in this area.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [EM235].

Complementary and related courses EM236 complements ME234 *Using mathematical thinking* and these two courses together will form the standard version of Part A of the Advanced Diploma in Mathematics Education in the associate programme.

Assessment There are tutor-marked assignments, based on study of the course materials and on analysis of mathematical activities carried out with children, and an examination.

Cassettes There are returnable video cassettes and you will need the use of a VHS machine from time to time. Some tutorials may be based on video excerpts. There are audio cassettes associated with each of the main sections of the course.

Computing The use of computers and calculators in teaching mathematics is an important theme of the course and we assume that you will have access to these in your classroom, as is required by the national curriculum.

Students with disabilities If you have a visual handicap you may have difficulty with the video material. Please ask the Office for Students with Disabilities for further guidance.

Set book You will need to buy the course reader, E. Lowe and D. Pimm (eds.) *The Teaching and Learning of School Mathematics*.

Software The course software is available in two versions, one for the Archimedes and one for the Nimbus. You will receive an order form in the first course mailing.

OVERVIEW

Most of the courses produced by the Mathematics Faculty fall into four main areas: pure mathematics, applied mathematics, computing and statistics. M101, the mathematics foundation course, provides introductory mathematics for all these areas, and each of them is followed up in the corresponding second-level course. After that there is enough choice for you to complete a degree in mathematics alone, choosing courses from pure and applied. If you wish to concentrate on computer science you will find that combining courses produced by the Mathematics Faculty with some of those from the Technology Faculty should meet your requirements. If you need a profile including statistics, the Faculty has courses at both second and third level in this area.

The main offerings at second level reflect this flexibility:

M203 *Introduction to pure mathematics*
MST204 *Mathematical models and methods*
M205 *Fundamentals of computing*
M245 *Probability and statistics*

M203, the full-credit second-level course in pure mathematics, has M101 as a recommended prerequisite. The topics covered in the course are linear algebra, group theory, geometry and analysis. The nine linear algebra and group theory units and four geometry units build on the algebra and geometry in Blocks IV and VI of M101; while the ten analysis units build on Block III of M101, developing further calculus techniques as well as placing the foundations of calculus/analysis on a firm theoretical basis.

M203 serves as a prerequisite for the third-level pure mathematics course M332 *Complex analysis*. M203 is also a preferred preparation for M381 and can be used as an alternative to MST204 to prepare for M371.

MST204, the full-credit second-level course in applied mathematics, has M101, [MS283] (or its replacement MS284) or TM282 as recommended prerequisites. About half the units are about mathematical methods, developing further both calculus and matrix techniques, and the other half are about the use of mathematical models that employ such methods to solve real problems. The work on models subdivides into nine units on mechanics, two on non-mechanical models, and four weeks of project work in which you construct your own mathematical model for a chosen problem. The course serves as a prerequisite for the third-level course SM355 *Quantum mechanics*, and is good preparation for SMT356 *Electromagnetism* and S354 *Understanding space and time*. It is also a prerequisite for MST322 *Mathematical methods and fluid mechanics*, M371 *Computational mathematics* and M372 *Numerical methods for differential equations*.

M205, the full-credit second-level course in computing, does not have M101 as a prerequisite; it can be preceded by any foundation course. It is designed to be more than a general awareness course and lays a thorough foundation for further study of computer science: it concentrates on a rigorous approach to the development of computer programs using a structured top-down approach, although other important subject areas within computer science are introduced, such as operating systems, information systems and software engineering. The course serves as a prerequisite for the third-level computer science courses M353 *Programming and programming languages*, M355 *Topics in software engineering* and M357 *Data models and databases*.

The half-credit course M245 *Probability and statistics* has M101 or [MS283] (or MS284) as a recommended prerequisite. It is designed to provide a thorough foundation in probability and statistics. The idea and practice of simulation are exploited, along with familiar random processes from real life, to build a good working knowledge of simple probability models, their underlying distributions and the essential ideas of making inferences from statistical data. M245 is the recommended prerequisite for the two third-level courses M343 *Applications of probability* and M345 *Statistical methods*.

If you require what might be described as a broad BA degree in mathematics you would be well advised to take all of the above courses. The order in which the courses should be taken

depends very much upon you, but you should bear in mind that:

- The two full-credit courses M203 and MST204 both have a residential school.
- Two half credits taken in the same year demand more effort than one full credit.
- Students on M205 are expected to spend two or three hours each week throughout the course on the practical component.

With M101 these courses make up 4½ credits, and if you do a second foundation course, perhaps S102 or T102 to accompany the applied mathematics, this would bring the total to 5½. If the remaining half credit is to be taken in the broad area of mathematics, the two possibilities are either to broaden your degree or to attempt some slight degree of specialization.

If you decide to broaden your degree then some suitable courses to consider are:

MA290 *Topics in the history of mathematics*, which provides an introduction to the history of mathematics through a study of various historical texts, from Babylonian tablets to twentieth-century views. This course is suitable for both broadening a mainly mathematical degree and also for students who have taken few, if any, mathematics courses, since it introduces the history of several mathematical topics with a minimum of prerequisites.

TM222 *The digital computer* complements M205, and provides an understanding of the principles of operation and organization of a small digital computer (both mini and micro) through first-hand experience.

MDST242 *Statistics in society* complements M245 by presenting statistics in the context of everyday problems. The approach is less mathematical than that of M245 and there are no formal prerequisites. As an interdisciplinary course, MDST242 concentrates on applying statistical ideas and interpreting statistical results.

M261 *Mathematics in computing* complements M205 by introducing mathematical ideas necessary for a formal approach to computing. It concentrates on the mathematics relevant to the systematic production of computing software. The use of the mathematics for describing computing ideas is illustrated throughout. M261 requires one of M101, TM282 or MS283 (or MS284) as a prerequisite, and can be used as a prerequisite for M355, as well as providing material valuable for other third-level computing courses such as M353. M261 is primarily intended for students who hope to specialize in computing, but is also suitable for those mainly interested in pure mathematics, for whom it provides a 'mathematical' view of computing.

TM361 *Graphs, networks and design* is a wide-ranging course covering such topics as electrical and related networks, the geometry of tessellations and transport planning. This is one of the very few third-level courses which have no specific second-level mathematics courses as prerequisites. Its choice of topics has made it popular with teachers of modern mathematics syllabuses as well as with people who are interested in applications of pure mathematics.

If you wish to specialize by taking third-level mathematics courses we should warn you that with very few exceptions (TM361 and possibly M257) they are more difficult than the second-level courses in the same way that second-level courses are more difficult than the foundation course. For this reason you are advised not to attempt a third-level course unless you have passed the recommended prerequisite(s) with at least a Grade 3 pass and preferably a Grade 2. It is, however, possible to specialize to some extent in each of the four areas mentioned below. The following notes are only on courses central to these areas. For a complete list of related courses you should consult the Tables of Related Courses.

Pure mathematics (prerequisite M203)

M332 *Complex analysis* This course generalizes the analysis in M203 for functions of a complex variable. It brings in the topology of the plane and the geometry of functions as mappings, and applications to the evaluation of integrals.

M381 *Number theory and mathematical logic* This course is in two separate halves; one studies the idea of mathematical logic (which underpins all of mathematics) and the other is an introduction to number theory (a perennially fascinating subject to everyone interested in mathematics).

Fourth-level courses

In 1992 the Pure Mathematics Department is introducing its fourth-level 'suite of courses'. These are on more advanced topics than the third level and require more mathematical background and experience. Each course will be presented every fourth year. At present we intend to introduce M431 *The Lebesgue integral* in 1992 and M434 *Differential geometry* in 1993. *The Lebesgue integral* studies a theory of integration more general and powerful than the Riemann integral (of M203, for example). The course includes a discussion of the theory of measure and ends up with applications to Hilbert space and Fourier series — of great importance in both pure mathematics and mathematical physics.

Applied mathematics and mathematical physics (prerequisite usually MST204)

MST322 *Mathematical methods and fluid mechanics* Part of the course is about using mathematical models to describe some flows of real fluids and the other part is concerned with the development of various mathematical methods which prove useful in fluid mechanics and other branches of applied mathematics.

MS323 *An introduction to non-linear dynamics* This new course is an introduction to simple dynamic systems with the emphasis on their qualitative behaviour. Some aspects of chaotic motion are considered.

M371 *Computational mathematics* As the title suggests, this course is about numerical techniques for solving problems by computer. It does not involve you in programming though it does require considerable use of home computing.

M372 *Numerical methods for differential equations* This new course looks at the methods used to solve ordinary and partial differential equations on the computer, and at the theory behind them. No programming is involved although there is extensive use of home computing.

Other courses relevant to applied mathematics and mathematical physics are listed under other faculties. They include:

SM355 *Quantum mechanics*
SMT356 *Electromagnetism*
S354 *Understanding space and time*

Computing

The Faculty offers at present three third-level computing courses: M353 *Programming and programming languages*, M355 *Topics in software engineering* and M357 *Data models and databases*.

M353 deals with the theory and practice of the design and implementation of programming languages with an emphasis on the needs of the programmer. This course requires home computing and is one of the courses in the University's home computing policy.

M355 is concerned with showing how engineering techniques can be used in the development of large-scale systems. The course draws heavily on the mathematics taught in M203 or M261.

M357 is an advanced computing course presenting in detail the many aspects of database technology, including an analysis of the properties of information and its representation in terms of data models.

Statistics

The Faculty is offering two third-level courses in statistics, M343 *Applications of probability* and M345 *Statistical methods*.

M345, a course in the basic methods of statistical data analysis, takes you on from M245 to learn mainstream techniques in such areas as regression analysis, analysis of variance, contingency table analysis, non-parametric methods and survey sampling. Use of a computer package is an important feature. Practical applications are emphasized throughout and extensive use is made of data examples from engineering, medicine, economics and other fields.

To complete the third-level statistics profile, M343 *Applications of probability* develops the ideas of probability and random processes that are introduced in M245. Using a variety of mathematical techniques, this course studies the properties of random phenomena in real

contexts such as changing population sizes, queues, epidemics and events occurring in space and time.

The recommended prerequisite for M343 and M345 is M245 or [MDT241].

General advice

Certain combinations of mathematics courses are regarded by other institutions as equivalent to an honours degree in mathematics from a traditional university, for example for the purpose of recognition as a graduate of the Institute of Mathematics and its Applications.

The computing courses, including T223, are recognized for exemption from Part I of the professional examinations of the British Computer Society.

Further information about recognition is given in Section 1 of this publication.

A note for teachers

The broadly based degree described above might well suit a mathematics teacher dealing with pupils across the age range 11-18, while those who concentrate on teaching sixth-form pupils might be better advised to specialize in one or two of the four main areas described earlier and to consider going on to take an honours degree. MA290 may provide useful background information for those teaching secondary school mathematics. Teachers who may or may not be mathematics specialists could be interested in the following two courses, neither of which assumes a mathematical background, nor has M101 as a prerequisite:

ME234 *Using mathematical thinking* This course is designed for teachers of pupils from 5 to 16 and explores a wide range of issues concerned with mathematical problem-solving. Other topics such as the place of mathematics within the curriculum and assessment and evaluation are also examined in depth.

EM236 *Learning and teaching mathematics* Designed to complement ME234, this course is about the mathematical education of children between the ages of 5 and 16. It supports approaches to teaching mathematics which build on children's existing knowledge and understanding, while taking into account the national curriculum and its assessment requirements.

Advice for science and technology students

Besides M101, there are two introductory second-level half-credit mathematics courses. There are TM282 *Modelling with mathematics: an introduction* and MS284 *An introduction to calculus*. M101, MS284 and TM282 are excluded combinations, which means that you can count only one of these courses for credit towards your degree, so it is important that you make the right choice between them.

If your main interest is in science or technology and you wish to take two foundation courses, you may be undecided as to which courses to take from T102, S102 and M101. If you choose S102 and T102 and either TM282 or MS284, you will be prepared to do some, but not all, higher-level courses with a significant mathematical content. If you wish to study only one foundation course, or have advanced standing and need none, you will want to know just how much mathematics to include.

M101 is essential if you want to have a substantial amount of mathematics in your degree profile, but undoubtedly many technology and physics courses require some mathematical expertise as well, and so M101 would provide a suitable background for these areas. Alternatively you may not be able to take M101, or may prefer not to; then your choice between TM282 and MS284 may depend on the topics you wish to study later in your degree programme. In general, TM282 takes the technological approach of using mathematical results without going into too much detail about how they were derived, whereas MS284 appreciates that physicists use mathematics as a language and concentrates a little more on the principles involved. In this sense it is more akin to M101.

Points which you may like to consider when making your choice between M101, MS284 and TM282 are:

- There is likely to be much more local tuition on M101 than on either MS284 or TM282 (ask your Regional Centre for details).
- For higher-level mathematical courses M101 is by far the best prerequisite and MS284 is second

best. MST204 can be taken after M101, MS284 or TM282, but M101 and MS284 are the preferred prerequisites.

- For many physics courses M101 or MS284 (but not TM282) is the recommended mathematical prerequisite.

- For many technology courses TM282 or M101 (but not MS284) is the recommended mathematical prerequisite.

- TM282 assumes a slightly less mathematical background than MS284 or M101.

- All three courses give an introduction to mathematical modelling (TM282 has more on this than M101 or MS284).

- TM282 has no computing. The computing in M101 and MS284 is confined to the residential school.

- Each of MS284 and TM282 (and M101) has a one-week residential summer school.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and presentation dates are listed in Table III.

M101

MATHEMATICS: A FOUNDATION COURSE

Foundation level: full credit

'Use your head to learn the subject — use the subject to learn to use your head' (G. Polya, twentieth-century mathematician). What is mathematics, and what can it do? In this course we set out to answer this question by helping you to understand mathematics and to use it. But understanding mathematics requires doing mathematics. It also requires the development of a certain degree of intellectual maturity and a willingness to do some thinking for yourself.

This means that a mathematics course, however modest its dependence on previous knowledge, presents you with a real intellectual challenge. We have tried to organize the foundation course to help you meet this challenge. The intention is to get you doing mathematics in order to help you understand the ideas underlying the development of this important subject.

The course has two general aims:

- To introduce and illustrate some of the methods and languages of mathematics and show their usefulness to those who do not intend to study any further mathematics.
- To prepare you for the study of higher-level courses with a significant mathematical content by giving you some basic skills and concepts required for such courses.

To achieve the first aim the course is designed to be self-contained and of general interest. We hope it will give you the ability to make the transition from the common-sense view of the world to the more abstract and theoretical view that is sometimes necessary in order to interpret, analyse and control the world around us.

As part of our approach to the second aim, we stress not only the *content* of the mathematics (the need for good notation, definitions and theorems, methods of proof, techniques and applications), but also the way in which mathematical training will help you to think effectively when challenged with new problems and situations.

One of the most important objectives of the course is to help you discover something of how mathematics is learned and to acquire the confidence you need to proceed with further studies involving mathematics. For this reason we have chosen to emphasize the directed activity approach to learning mathematics because this engages you in doing mathematics. If you learn to study independently and to tackle problems effectively, then you acquire self-confidence and gain a foundation for extending your knowledge in directions which are useful and relevant to you.

Content The course is arranged in six blocks each of which comprises study materials for five weeks. As well as the six blocks, there is a 'floating' unit designed to synthesize and build upon some of your experience in the rest of the course.

The first block introduces you to independent study of mathematics. It covers some basic

techniques necessary for the study of later blocks. Whatever your background, we hope that by the time you complete this block you will be in a position to start the rest of the course on a par with other students.

The material in the second block helps you to consolidate the process of mathematical reasoning introduced in the first block and build a firm basis of techniques for your study of Block Three and the more advanced topics in the course.

The third and fourth blocks are the core of the course. Block Three is an introduction to the calculus and Block Four uses matrix algebra (a technique for operating with collections of numbers) to explore mathematical situations such as probability and geometrical transformations.

The last two blocks lead the way to further studies. Block Five discusses the application of mathematics to real situations and is an introduction to courses where the emphasis is on applying mathematics. Block Six looks towards courses concerned with the development of mathematics itself; the topics covered have been chosen to introduce some of the ideas which will be studied at greater depth in subsequent courses. These last two blocks will be presented alternately.

The 'floating' unit encourages you to reflect on how you think about and learn mathematics.

When you have completed the course, you will have a general view of some of the characteristic ideas in mathematics and appreciate how they are used in other subjects. You will have mastered a number of basic skills and be able to apply them to the study of new concepts and problems, and you will also know how to use a pocket electronic calculator and computer as aids to solving mathematical problems.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M100], [MS283], MS284, [MST281], [TM281] and TM282. See advice for Science and Technology Students in the Mathematics Overview.

Preparatory advice Before beginning the course you will need some basic mathematical skills, corresponding very roughly to those covered in the first four years of secondary school mathematics.

We shall provide a preparatory package which should be mailed to you in October. This introduces the techniques required to study mathematics successfully within the Open University, as well as guiding you through some preparatory work. A diagnostic quiz will enable you to judge the extent to which your previous experience meets the entry requirements of M101. You will then be invited to do preparatory study based on Volume 2 of *Countdown to Mathematics* by L. Graham and D. Sargent, which is included in the package. Work with a calculator is part of this preparation, and there are also two optional computer-marked assignments which you may wish to submit for some indication of your progress.

Assessment (i) Eleven TMAs (35%); six CMAs (15%); (ii) the examination (50%). Substitution can apply to up to two TMAs and one CMA. The TMAs are of two kinds: mid-block TMAs, based on the first three units of each block, and end-of-block TMAs, designed to review the ideas of a block. There is also an assignment on the residential school work, which includes some computing and problem-solving using the ideas taught in the 'floating' unit. Assignments are equally weighted so you will have considerable choice as to where to concentrate your studies.

Broadcasts and cassettes The thirty-two television programmes are part of the teaching material. Although the course units contain summaries of them, we feel that if you have not seen the programmes you will be at a disadvantage since they contain assessable material. You are therefore advised not to attempt the course unless you have access to a television set or to recordings of the programmes.

There are sixteen radio programmes which have a magazine format, but the core of each programme is a tutorial based on topics which previous M101 students have found difficult.

The course material includes audio cassettes which are an integral part of many units, so you will need the use of a cassette player.

Residential school A one-week course-based summer school. You will be able to meet other students, to revise and review the work you have done so far, to attend lectures on mathematical topics and to work in small groups with tutors on activities such as problem-solving and practical projects. You will be actively doing mathematics with other people, which should help you to put your own work into perspective and stimulate and encourage you to tackle some of the things that have been bothering or daunting you. You will have access to a computer at the school, used to solve mathematical problems.

Calculator You are expected to buy an electronic calculator, which is used throughout the course to explore new ideas and to solve problems. The preparatory package sent to you in October specifies the minimum facilities your calculator must have, and *Countdown to Mathematics* (details above) gives

advice on how to use it so that you can become acquainted with some techniques before the course starts.

Students with disabilities This course has been successfully completed by students with disabilities. Some difficulty is foreseen at the residential school for people with severe restrictions of mobility, aural, visual and speech handicaps, but the course should certainly not prove impossible. If you have a visual handicap you may have problems with assignments, and the frequent presence of a sighted helper is regarded as most important for cross-referencing from cassettes to correspondence materials. The course and supplementary material is available on tape.

M203

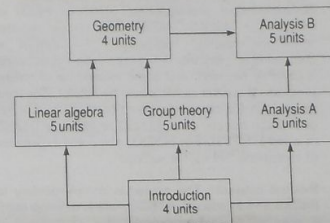
INTRODUCTION TO PURE MATHEMATICS

Second level: full credit

This course gives an introduction to many of the basic areas of pure mathematics and to the relationships between them. It is not recommended for students who have little previous mathematical experience (see Recommended Prerequisites below).

The course is suitable both for those who do not wish to carry the subject further and for those who wish to take third-level courses in pure mathematics. Experience has shown that only those who have obtained an excellent standard in their second-level courses have a good chance of successfully completing third-level pure mathematics courses.

Content M203 is split by subject into six blocks which are related as shown in the diagram.



The content of each block is as follows:

Introduction Revision of sets and functions; curve-sketching; symmetry; symmetry groups, co-ordinate and vector geometry; abstract groups and subgroups, group isomorphisms.

Linear algebra Vectors, orthogonality, matrices, linear transformations, linear equations, eigenvectors, diagonalization, abstract vector spaces and applications.

Group theory Cyclic groups, cosets and Lagrange's theorem, permutations, conjugacy, normal subgroups, homomorphisms, first isomorphism theorem, quotient groups, group actions, orbits and stabilizers.

Geometry Conics, affine geometry, quadric surfaces, projective geometry, non-Euclidean geometry, the Kleinian view of geometry.

Analysis Real numbers, functions, continuity, sequences and series, differentiation, integration, the fundamental theorem of calculus, power series, differential equations, flows, proofs in analysis.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M202], [M211], [M212] and [M231].

Recommended prerequisites M101. M203 can also be studied if you have substantial previous experience in mathematics at near-university entrance standard (for instance, a pass in A level mathematics).

Related courses M203 is a recommended prerequisite for M332, M381 and M431.

Assessment TMAs 01-08 (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Twenty-nine television programmes. Considerable use is made of audio cassettes.

Residential school A one-week course-based summer school.

Students with disabilities If you have a severe aural or visual handicap you will not benefit fully from television and audio cassette based sections, but you should still be able to follow the course. Course and supplementary materials are not available on tape.

Calculator You will need a scientific calculator.

M205

FUNDAMENTALS OF COMPUTING

Second level: full credit

This course has been devised as a first general course in computing. It should be of interest to people whose jobs require them to have more than a passing knowledge of the use of computers. This would include those already working with computers who wish to formalize or broaden their knowledge. It is also intended for students who wish to pursue the subject at a higher level by taking third-level computing courses.

The main theme of the course is a rigorous approach to the development of computer programs using a structured language, Pascal. The practical work is extensive and requires access to a home computer. The course also includes an introduction to software engineering, information systems and social implications of computing.

This course is not suitable for anyone who just wants to know how to program a micro using BASIC or to acquire only a superficial knowledge or awareness of computers.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M252] and [PM252].

Usually students who have passed a course from an excluded combination may not register for another course from the same excluded combination. However, in this instance, those who have successfully completed [M252] but have not had it included in the award of a BA degree can register for M205 on condition that if they pass M205 they relinquish the half credit previously obtained for [M252]. You will not be allowed to base your decision on the grade or pass obtained on M205. If you are awarded a pass for M205, you must relinquish the half credit for [M252] whatever the grade. If you wish to do this in 1992 you should consult your tutor-counsellor first.

Complementary and related courses M205 is a recommended prerequisite for all third-level courses in computing, namely M353, M355 and M357. M205 also links with [TM222].

Assessment Eight equally weighted TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Sixteen television programmes and one audio cassette which is an essential part of the course.

Computing You will be expected to spend at least 2-3 hours each week on practical work. You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4). Software will be provided.

Note This course does not require GEM or a mouse, so equipment without these can be used.

Students with disabilities There may be difficulties but the course is not impossible for students with visual, aural or speech handicap or impaired manual dexterity. You must, however, be able to use a microcomputer. You are advised to seek guidance and further information from the Adviser on the Education of Students with Disabilities.

Preparatory reading No preparatory study is necessary, but if you would like to become familiar with some aspects of Pascal we recommend the introductory chapters of the following: D. Cooper and M. Clancy (1990) *Oh! Pascal!*, W. W. Norton and Co. Elliot B. Kaffman (1989) *Pascal*, Addison-Wesley.

M245

PROBABILITY AND STATISTICS

Second level: half credit

This course is designed to give a mathematical introduction to the concepts of probability and statistics. It has four main aims:

- To give you a good working knowledge of simple probability models.
- To concentrate on applications and the handling of underlying distributions.
- To teach the essential ideas of making inferences from statistical data.
- To develop your statistical intuition.

M245 introduces the idea of chance mechanisms and associated results in probability and statistics. From the start, the ideas and practice of simulation are exploited along with familiar random processes taken from real life. Concepts and basic rules are developed systematically, with the emphasis on applications and the

McKeag (Prentice-Hall)
Jillman (Addison-Wesley)
Concurrent Mellish (1985) Verlag, Germany
Science — Welsh, J. Program Science (1985) Data Note You books, the

example). After studying abstract data types you should be in a position to appreciate the features which should be present in a modern high-level programming language. The course also compares two contrasting approaches to programming epitomized by Pascal (a procedural language) and Prolog (a non-procedural language).

The aims of the course are:

- To examine formal methods of program specification through abstract data types.
- To examine the implementation of data structures.
- To examine high-level programming language support for these principles.
- To compare procedural and non-procedural programming languages.
- To study the methods of programming language definition.
- To study programming language translation (compiling).

The course is about technical aspects of programming languages and their use and less emphasis is placed on program development although a knowledge of such techniques is assumed.

Content

Unit 1 Introduction to the course. Revision of advanced Pascal programming including user-defined types, subranges and sets.

Units 2, 3, 4, 5 and 6 Specifying and representing data structures. The study of abstract data types (ADTs), through the formal specification of their syntax and semantics, in a way that is independent of any programming language. The implementation of ADTs and the high-level programming language support required including pointer variables, recursion and data hiding.

Unit 7 Concurrency. How concurrent programming can be of benefit to the programmer and the problems that arise in non-sequential programming.

Unit 8 Virtual machines.

Units 9 and 10 A study of the programming language Prolog.

Units 11 and 12 The definition of programming languages. Syntax and semantics.

Units 13, 14 and 15 Programming language translation (compiling).

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites The course assumes a knowledge of the material in M205 or [M252]. It would be beneficial to have gained a good grade in M205 or [M252] before tackling M353. If you wish to take M261 you should do so before taking M353. M261 is not a recommended prerequisite for M353 but does provide an introduction to some of the topics studied in depth in M353.

Complementary and related courses M261, [M352], M355, M357.

Assessment Four TMA's (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes Audio cassettes are included in the course materials.

Computing Practical work in the form of programming and the use of packages is an important and substantial part of the course. The packages necessary for the course are provided. You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4).

Note This course does not require the use of GEM or a mouse, so equipment without these can be used.

Students with disabilities There may be difficulties but the course is not impossible if you have a visual, aural or speech handicap or impaired manual dexterity. You must, however, be able to use a microcomputer. Please ask the Adviser on the Education of Students with Disabilities for full information and advice.

Other information The following books give some indication of the nature of the topics covered in the course (they are not set books nor do we cover their entire contents in this course): J. Welsh and M. McKeag (1980) *Structured System Programming*, Prentice-Hall. A. V. Aho, J. E. Hopcroft and J. D. Ullman (1983) *Data Structures and Algorithms*, Addison-Wesley. M. Ben-Ari (1982) *Principles of Concurrent Programming*, Prentice-Hall. Clocksin and Mellish (1981) *Programming in PROLOG*, Springer-Verlag. Goldschlager and Lister (1982) *Computer Science - a Modern Introduction*, Prentice-Hall. J. Welsh, J. Elder and Bustard (1984) *Sequential Program Structures*, Prentice-Hall. Stubbs and Webre (1985) *Data Structures*, Brooks/Cole.

Note You are not expected to buy any of these books, the details of which are given only for interest.

M355

TOPICS IN SOFTWARE ENGINEERING

Third level: half credit

This course introduces the current development of software engineering, that is, the treatment of complex software development as an engineering process. The application of mathematical methods to the process is demonstrated as a solution to many of the problems encountered because of the increasing complexity of software.

The aim of this course is to introduce the concept of software engineering and current formal and informal techniques which can be used in the development of complex systems. By the end of the course you will be able to use formal methods of software development and will have a good understanding of the main problems that occur in complex systems.

Content The course is presented in four blocks, the first three containing four units and the last block three units.

Block I introduces the concept of software engineering, defining the life-cycle of a software project from analysis of requirements through to testing, integration and maintenance. It discusses graphical data flow techniques for analysis and design, and applies them to a case study.

Block II teaches a formal approach to software development using the Vienna Development Method (VDM), which is a mathematical approach to the development of programs, with well defined steps and clearly defined proof obligations. The concepts of data abstraction and reification and proof of program correctness are introduced and developed.

Block III The problems involved in concurrent processes are described using ODM (Open Development Method), starting with process diagrams and continuing with the formal design notation CSP (Communicating Sequential Processes). This method tackles the problems which arise in communicating processes. The fundamentals of the concurrent programming language Occam are also taught.

Block IV covers project management including the production of a project plan, the techniques used to ensure that it is adhered to, and quality control methods to see that the final product conforms to appropriate standards. Software metrics and their use are also discussed.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites M355 is designed for students who have successfully completed M261 (or M203 if you have a computing background) and M205 or [M252]. It is strongly recommended that M353 should also be studied before tackling M355.

Assessment Four equally weighted TMA's (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes Four audio cassettes are included in the course materials, for presentation of case study material and to aid understanding of the formal mathematical methods used.

Students with disabilities The course materials are available on audio tape. If you have impaired hearing you will not benefit from the audio-cassette-based sections, but you will still be able to follow the course.

M357

DATA MODELS AND DATABASES

Third level: half credit

This is an advanced computing course concerned with an application of computers which has an increasing influence on modern society. Its aims are to provide a detailed presentation of the many aspects of database technology, to identify the common concepts that are used as the basis of such technology and to analyse the properties of information and its representation in terms of data models. At the end of the course you should be able to:

- Use the terminology associated with database technology.
- Use the facilities of a database management system to demonstrate the functions of data definition, storage and retrieval.
- Give the semantic interpretation of examples

of different types of data model and create data models to represent the semantics of example situations.

- Design and specify schemas using standard data definition languages, evaluating some designs by trying them out.

Content The course describes the role of database management in the context of the type of information systems in most modern organizations. The many facets of the subject are discussed in terms of design, creation and use of databases by a variety of people with different requirements and responsibilities.

Data models are introduced as a way of capturing the information content of an organization's data. Techniques for analysing data and representing it in terms of a data model are considered. The relational data model is described in detail, in terms of both its theoretical properties and its use in a particular type of database management system, based on SQL. Finally, there are some general topics related to the administration and control of database systems and how database technology is evolving.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [M352].

Recommended prerequisites [M252] or M205.

Assessment Four TMA's (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Eight TV programmes, and two audio cassettes.

Students with disabilities This course may present you with difficulties if you have visual or aural impairment, because a microcomputer and audio cassette are used simultaneously. We hope that the course material will be available on tape in 1992.

Computing An important aspect of M357 is the provision of database software enabling you to gain practical experience of some of the concepts covered by the course. You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4) and has two disk drives.

M371

COMPUTATIONAL MATHEMATICS

Third level: half credit

This course is about numerical techniques in operational research which are used to solve problems on the computer. It describes these techniques and considers how, where and when they can be applied.

The course gives you the ability to recognize whether a particular problem can be solved numerically; to formulate the problem in mathematical terms; to choose the right method; to understand the conditions in which the method works; to evaluate the results, and to estimate their accuracy.

Content The course examines methods which are used to tackle scientific, technological, business and social problems. These problems arise in a branch of mathematics known as 'operational research'. Because of the potential breadth of the subject, the course concentrates on a few selected areas which are currently most important in computational mathematics. The course is divided into four blocks covering the following topics:

Block I Methods of solving a single non-linear equation, a system of linear equations and a system of non-linear equations. Errors in numerical processes, convergence, ill-conditioning and induced instability.

Block II Formulation and numerical solution of linear programming problems using the product form of the inverse-basis method. Formulation of integer programming problems and the branch and bound method of solution. Sensitivity analysis.

Block III Formulation and numerical solution of unconstrained and constrained non-linear optimization problems using the DFP and BFGS methods with line searches. Illustrative applications.

Block IV Random sampling. Monte Carlo methods and variance reduction techniques. Computer simulation of queues with probabi-

listic arrival and service times. Use of the simulation language SIMIAN.

The emphasis is on the practical nature of the methods, but straightforward mathematical analysis is included when it is relevant. The topics covered include a blend of applications and case studies with the mathematical theory and computational procedures.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [M351].

Recommended prerequisites A knowledge of calculus and matrix theory up to the level covered by MST204 or M203. Of these two courses MST204 is the more useful.

Complementary courses Several important topics in numerical computation are omitted from this course. A brief introduction to the numerical solution of differential equations and eigenvalue problems can be found in MST204. A complementary course in numerical methods, M372, will be presented for the first time in 1992. If you are interested in formulating problems you are advised to study T301.

Assessment Four TMA's (50%) and the examination (50%). There is one TMA for each block; each has a practical element in which the packages provided by the Academic Computing Service must be used on the microcomputer. Substitution can apply to one TMA.

Cassettes Audio cassettes are used together with the teaching packages on the microcomputer.

Computing You will need access to a microcomputer which meets the specification of the University's home computing policy (see page 4). Both teaching and applications packages will be supplied on disks. Computer programming is not part of the course.

Calculator You will need a scientific calculator in order to work through some of the exercises by hand.

Students with disabilities This course is not recommended for students with impaired manual dexterity. Visually handicapped students will also have difficulties. Course and supplementary materials are not available on tape.

M372

NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS

Third level: half credit

This course teaches both the theory and the practical application of numerical methods used to solve ordinary and partial differential equations. It is a sister course to M371 and, like M371, makes extensive use of teaching and applications software on a home computer.

Content The course is divided into four blocks with three theoretical units in each block. A quarter of the study time is devoted to practical work on the home computer. Throughout the course the theory is prompted by practical examples and case studies.

Block I outlines numerical methods of linear interpolation, using polynomials and piecewise polynomials, and of integration. These methods are fundamental to those used in the rest of the course.

Block II covers some of the methods used in solving initial value problems in ordinary differential equations and in systems of differential equations. The intention is to enable you to use commercial software sensibly and with insight.

Block III Boundary value problems in ordinary and partial differential equations are solved using finite difference methods. The emphasis is on the study of a small number of equations in depth.

Block IV The finite element method is introduced and applied to elliptic and parabolic partial differential equations.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites A knowledge of calculus and matrix theory up to the level covered by MST204.

Complementary courses M371 *Computational Mathematics*. If you are interested in formulating problems you are advised to study T301.

Assessment Four TMAs (50%) and the examination (50%). There is one TMA for each block; each has a practical element in which the packages provided by the Academic Computing Service must be used on the microcomputer. Substitution can apply to one TMA.

Cassettes Audio cassettes are used together with the teaching packages on the microcomputer.

Computing You will need access to a microcomputer which meets the specification of the University's home computing policy (see page 4). Both teaching and applications packages will be supplied on disks. Computer programming is not part of the course.

Calculator You will need a scientific calculator in order to work through some of the exercises by hand.

Students with disabilities This course is not recommended for students with impaired manual dexterity. Visually handicapped students will also have difficulties. Course and supplementary materials are not available on tape.

M381 NUMBER THEORY AND MATHEMATICAL LOGIC

Third level: half credit

This course is for students who wish to specialize in pure mathematics. It provides an opportunity to study two topics within the field of pure mathematics comparable with honours options at conventional universities, as a first stage towards further specialized study at fourth level or in postgraduate work.

Content Each topic consists of eight units based on its own set book.

• **Number theory** This is based on the set book Burton, *Elementary Number Theory*, Allyn and Bacon (revised printing, 1980). You must buy this edition and no other; you will be told about special arrangements for obtaining it. It is concerned with the integers, and in particular with the solution of classical problems requiring integer solutions. The material covered is essentially that contained in Chapters 1-7, 9 and 13 of the set book. We first consider some elementary properties of the integers such as divisibility and greatest common divisors. This leads to a method of finding solutions of linear Diophantine equations $ax + by = c$, i.e. finding solutions to the equation which are integers. Every integer greater than 1 is shown to be a unique product of primes and some results are obtained concerning the distribution of the primes among the integers. In the theory of congruences, methods are developed for solving linear congruences $ax \equiv b \pmod{n}$ and the classical theorems of Fermat and Wilson are obtained. We then consider multiplicative functions, i.e. functions satisfying $f(mn) = f(m)f(n)$ for relatively prime integers m and n , and in particular Euler's ϕ -function which counts the number of integers in the set $\{0, 1, 2, \dots, n-1\}$ which are relatively prime to n . Returning to congruences we look at the solution of quadratic congruences which leads to Gauss's Law of Quadratic Reciprocity. Finally the theory of continued fractions is developed and applied as a method of solving further examples of Diophantine equations.

• **Mathematical logic** This topic is based on the set book Boolos and Jeffrey, *Computability and Logic*, Cambridge University Press, 2nd or 3rd edition (your course units will probably refer to the 2nd). Our aim is to prove Gödel's Incompleteness Theorem, a result of considerable philosophical importance on the limitations of what mathematicians can ever achieve. To lay the ground for a proof of this theorem, the first four units are devoted to discussing three apparently different notions of computability which all in fact coincide, and the second four units include an introduction to proof systems for the propositional calculus, the predicate calculus and basic number theory. If you would like to get the flavour of this topic you can look at Chapters 1 to 8 and 14 to 16 of the set book, although these latter chapters may seem rather complex in the absence of the course material.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M382], [M383], [M384], [M385]; and also [M335] if either of the topics you covered in the [M335] examination was a topic in M381.

Recommended prerequisites M101 and at least a further credit in second-level mathematics courses, with a Grade 3 pass or better, preferably M203 or [M202].

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes Five audio cassettes.

Calculator Access to a calculator is desirable.

Students with disabilities This course may present substantial difficulties if you have a visual disability but would not be impossible. Course and supplementary materials are available on tape.

Set books See individual topics above.

M431 THE LEBESGUE INTEGRAL

Fourth level: half credit

This course presents the theory of the Lebesgue integral on \mathbb{R} and \mathbb{R}^k at a fairly elementary level. The Lebesgue integral is more general than the Riemann integral, discussed in previous mathematics courses such as M203, with which you are assumed to be familiar. It is a basic tool, for example in probability theory (measure theory), applied mathematics (Fourier series) and physics (where a rigorous treatment of quantum mechanics relies heavily on the concepts of Hilbert space and square integrable functions). Some basic ideas of measure (Lebesgue measure, length, area, volume) are discussed in M431, as well as applications to Fourier series and Hilbert spaces.

Content The course is based on Alan J. Weir *Lebesgue Integration and Measure* (paperback edition, Cambridge University Press), without which it will not make sense. The units are;

- 1 The Real Numbers
- 2 The Riemann Integral
- 3 Step Functions
- 4 The Lebesgue Integral on \mathbb{R}
- 5 Definite and Indefinite Integrals
- 6 The Lebesgue Integral on \mathbb{R}^k
- 7 Fubini's Theorem
- 8 The Monotone Convergence Theorem
- 9 The Dominated Convergence Theorem
- 10 Lebesgue Measure
- 11 Convergence and Normed Spaces
- 12 Hilbert Space
- 13 Fourier Series

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [M331].

Recommended prerequisites A sound knowledge of differential and integral calculus and some previous experience of the real number system are recommended. Such knowledge is obtainable from, for example, M101 and M203. A certain mathematical maturity would also be useful; the third-level course M332 *Complex analysis* would provide this.

Assessment Four TMAs and the examination. TMA 01 covers Units 1-3, TMA 02 Units 4-6, TMA 03 Units 7-10 and TMA 04 Units 11-13.

Cassettes There are audio and video cassettes, so you will need access to both audio and video cassette players.

Set book You will have to buy the set book, A. J. Weir *Lebesgue Integration and Measure*, Cambridge University Press, paperback edition.

MA290 TOPICS IN THE HISTORY OF MATHEMATICS

Second level: half credit

The main aim of this course is to introduce the study of the history of mathematics. This entails both telling the story of the development of mathematics in the past, and practising the historical judgements and methods which enable that story to be told. Subsidiary aims are to deepen your understanding of what mathematics is, and the role it has played in society and in increasing our knowledge of the world.

The course will be of interest to students of mathematics seeking further understanding of its historical background, to teachers of mathematics at all levels and to students of social and cultural history.

Content The course material falls into four blocks, of two month's study time each.

Block 1 Mathematics in the ancient world This moves from the earliest evidence of mathematical activity to the achievements of classical Greece. Mathematics has ever since borne the stamp imprinted by the Greek approach.

Block 2 Through the Middle Ages to the seventeenth century The Islamic development of algebra and the later European rediscovery of classical Greek texts helped lead to an unprecedented flowering of mathematics in the early seventeenth century: the time of Napier, Descartes, Kepler and Galileo. The block also contains a case study of English mathematics education during this period.

Block 3 The seventeenth and eighteenth centuries What were the consequences of the independent invention of the calculus by Newton and Leibniz (building on the work of many earlier mathematicians)? We trace some developments through the eighteenth century, and examine how they blended both with the study of nature and with the algebraic concerns of the great Swiss mathematician Leonard Euler.

Block 4 Topics in nineteenth-century mathematics Is Euclid's geometry necessarily true, or can other geometries be devised? How did algebra and professionalization develop together? Was the French Revolution a good thing (for the development of geometry)? What to do about the foundations of the calculus? Can calculation be mechanized? These are some of the questions discussed in the final block, which surveys some characteristic topics of nineteenth- and indeed twentieth-century mathematics.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Any mathematics needed is generally explained through its historical development in the course, so that modest mathematical competence and a willingness to engage with mathematical explanations is more important than prior knowledge.

Related courses History of science courses, [A281] and A282.

Assessment Four essay-type TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts Eight TV programmes. There are also audio cassettes.

Preparatory reading If you want to get a preliminary flavour of the kind of thing the course covers, you could browse through a standard work such as Carl B. Boyer, *A History of Mathematics*, Wiley. (This book is comparable in level with MA290.)

Set book J. G. Fauvel and J. J. Gray (eds.) *The History of Mathematics: A Reader*, Macmillan.

MDST242 STATISTICS IN SOCIETY

Second level: half credit

What is statistics and what can it do? This course sets out to answer these questions by investigating a variety of everyday situations using statistical techniques. It is intended for students who are interested in the influence of statistics on everyday life, as well as for those who need a basic understanding of statistical ideas for their studies in other disciplines.

The aims of the course are:

- To provide an uncomplicated yet critical introduction to current statistical ideas and practice.
- To introduce a wide diversity of applications of statistics in everyday life.

Content We begin with a unit which introduces some basic ideas of statistics, and various ways of presenting data. The rest of the course is divided into three blocks of five units each.

Block A asks 'Are we getting better off?' In this broad economic context, techniques or explora-

tory data analysis are developed. Methods of summarizing data, graphical representation and relationships between variables are discussed, and we look at how price indices and data are obtained from surveys.

Block B The topic area is education. The basic ideas of statistical inference are introduced in the context of questions such as 'Does education pay?' and 'What factors affect educational performance?' The statistical concepts covered include probability, confidence intervals, hypothesis testing, contingency tables, and the normal distribution.

Block C rounds off the course by looking at medicine and health. We investigate statistical aspects of experimentation in the context of drug testing. The relevance of statistics to private and public decision-making is underlined by asking questions like: 'Is my child developing normally?' and by looking at the relationship between smoking and lung disease.

In the last unit of each block we review the statistical ideas of the block and illustrate how they can be applied in the field of energy research, and, in particular, in the use of energy in the home.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites There are no formal prerequisites for the course, but you will need some very basic mathematical skills. We provide a diagnostic test which will let you know in detail what we require of you, and will enable you to judge to what extent you possess these skills. A book has been specially written to help students prepare for courses such as this, and it will help you to overcome any problems with the diagnostic test. The book is Volume 1 of *Countdown to Mathematics*, by L. Graham and D. Sargent, published by Addison-Wesley.

Related courses M245 looks more deeply at the applications of probability theory and takes a more mathematical approach than MDST242.

Assessment (i) Four TMAs (25%); (ii) five CMAs (25%) and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts There are eight TV programmes, grouped in four pairs. Each pair is part of each of the three review units and the introductory unit. The TV broadcasts are an important part of the course, and you will be at a disadvantage if you cannot watch them.

Cassettes Most units have a section based on an audio cassette.

Calculator You will need a calculator. If you have already bought the recommended calculator for a course such as M101, T102, [S101], S102 or MS283 it will be adequate for this course. Otherwise, details of the type you will need will be given in the Course Guide.

Students with disabilities Some difficulty is foreseen if you have a visual or aural handicap or impaired manual dexterity, but it is possible to overcome this.

ME234 USING MATHEMATICAL THINKING

Second level: half credit

This course is particularly suitable for students who are teachers of pupils between the ages of 5 and 16+, or are otherwise engaged with the education of children in this age range. It is suitable for all teachers who are interested in mathematics, as well as to mathematics specialists, and should support them in planning to implement the national curriculum. No mathematics beyond O level will be assumed, other than an interest in mathematical ideas and their application. In order to participate in the study and assessment activities you will need to be able to work with groups of children, preferably in a classroom.

As well as helping pupils to acquire mathematical knowledge and skills, a sound mathematics curriculum should encourage the ability to use and apply knowledge and skills in context. This is emphasized in both profile components of the national curriculum for mathematics. Such contexts may be mathematical, they may be associated with other areas of the curriculum, or they may be of an everyday nature. However, in order to be able to apply mathematical ideas, pupils also need to be able to make sense of those ideas themselves, which is often impossible to do in the abstract.

This course is about helping pupils to develop their own understanding and to take some responsibility for their own learning.

You are invited to work on some mathematics yourself as a learner, to observe your own learning processes and to relate what you notice about your own learning to that of your pupils in the classroom. The aim is to help you develop an awareness of mathematical learning processes which will provide insight into ways of helping pupils to learn. The computer and associated software will be used both in your own learning and in your work with pupils. Assessment and record-keeping in the mathematical classroom are also discussed.

Content The course is divided into three blocks. Block I is concerned with the investigation of mathematical ideas within a mathematics context; Block II with the investigation of mathematical ideas within a wider context, for example other curriculum areas or everyday situations; and Block III links the first two blocks in considering issues of assessment and evaluation, and of process links with other subject areas.

Block I presents mathematical domains concerned with numerical and spatial ideas, from which you select two to study as the main component of Units 2 and 4. This study will take the form of investigational work in and around the content of the domain. An investigational approach allows us to cater for a wide range of mathematical backgrounds. Unit 3 looks at processes inherent in mathematical problem-solving, and Unit 5 concentrates on classroom issues associated with pupils working investigatively in mathematics lessons.

Block II is concerned with tackling problems which are not initially mathematical in nature, but for which mathematics may provide a means of finding a solution. In Units 6 and 8 you will work on problems of various degrees of complexity with a strong emphasis on the links between the 'real' problem and the mathematical problem which is constructed from it. Statistical ideas and mathematical modelling strategies form a large part of this study. Unit 7 is concerned with classroom issues associated with pupils working on such problems.

Block III is about the place of mathematics in the curriculum and invites you to follow up ideas from the earlier blocks and their applicability across the curriculum. This will involve consideration of explicitly mathematical concepts and processes and of thinking and learning processes which are applicable in other subject areas. Important too will be areas of process and content of other subject areas which are applicable to the learning of mathematics.

Consideration is also given to assessment and evaluation, requiring you to examine your own criteria for evaluating your pupils' work and making assessments. In doing this, various styles of evaluation procedures will be considered and applied in the classroom.

NOTES FOR PROSPECTIVE STUDENTS

To complete this course successfully you will need access to a suitable group or groups of children; use of a computer (see below) and a video recorder with playback facilities; and the course reader.

Complementary and related courses ME234 replaces [PME233], but it is not an excluded combination.

ME234 complements [EM235] and EM236. ME234 can be paired with either [EM235] or EM236 as the standard for the first part of the Advanced Diploma in Mathematics Education in the associate programme. Please see Section 5 for more information about diploma courses.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA but not to TMA 03. TMAs 01 and 02 are associated with Block I and contain questions related to your own study as well as questions related to work you have done with pupils in the classroom. TMA 03 (Block II) includes describing and analysing a classroom project. TMA 04 (Block III) requires you to plan and prepare to evaluate a curriculum task.

The examination (50%) will cover the entire course, and you will be given detailed guidance about how to prepare for it.

Cassettes There are two returnable video cassettes. The first is in three 60-minute parts, each associated with one of the three blocks. The video material is an integral part of the study of course units.

The first 30 minutes of the second tape is about 'working with video' and is part of Unit 1 of the course. The next 60 minutes is a 'video anthology' for the whole course. Excerpts from this can be watched as referred to in units throughout the course, or used as further material for study and discussion groups or at tutorials.

There are also audio cassettes associated with some units.

Computing You must have access to one of the following computers: BBC B (with disc drive); BBC Master 128 (with disc drive); or Research Machines Nimbus PC. Unit 4 requires the use of software, which is provided for all of the options. You can choose other options that require either a spreadsheet or Logo. These are not supplied. Versions of them on any computer (not necessarily BBC or RM) will be suitable.

Students with disabilities If you have a visual handicap you may have difficulty with the video material; please ask the Office for Students with Disabilities for further guidance. Course and supplementary materials are not available on tape.

Set book D. Pimm (ed.) *Mathematics, Teachers and Children*, Hodder and Stoughton (course reader).

MS284

AN INTRODUCTION TO CALCULUS

Second level: half credit

This half-credit course at foundation level provides an alternative entry to applied mathematics and science courses for students whose main interest is the applications of mathematics. It is particularly suited to students of physics, but it also provides the necessary background for a wide range of mathematics, science and technology courses for those who do not wish to undertake the full rigours of a foundation course in mathematics.

The early units, with their audio and video tapes, take into account the likelihood that you are returning to the study of mathematics and have had little practice with the basic skills since leaving school. The first eight units cover essential material in areas such as trigonometry and properties of numbers; but each also has a short section that gradually improves your basic algebra as the course progresses. The next four units cover elementary calculus and are the core of the course, leading to the last four units which show how the various techniques can be applied. The following topics suggest the content of the course: computation, algebra, transformation and trigonometry, complex numbers, functions, graphs and inequalities, numbers from nature, functions and limits, differentiation, integration, scalars and vectors, mathematical modelling, differential equations. You will also study a short text on Taylor series at the residential school.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M100], M101, [MS283], [MST281], [TM281], TM282. See Advice for Science and Technology Students in the Mathematics overview.

Recommended prerequisites None, but you will need some very basic mathematical skills corresponding roughly to those covered in the first four years of secondary school. In the autumn you will receive a preparatory package which not only introduces the techniques you need for MS284 but also guides you through some preparatory work. A diagnostic quiz will enable you to judge the extent to which you meet the mathematical requirements of the course. Part of the preparatory study is based on Volume 2 of *Countdown to Mathematics* by L. Graham and D. Sargent, which is included in the package.

Assessment (i) Four TMAs (25%); (ii) six CMAs (25%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Cassettes The sixteen half-hour video programmes and the audio cassettes are an essential part of the course. They contain assessable material and you will be at a disadvantage if you do not work through them. The video programmes present ideas in a way that cannot be done with the printed page, and keep you in touch with the development of the course. The role of the audio cassettes is rather different and more to do with acquisition of particular skills.

Residential school The one-week summer school gives you an opportunity to overcome the more challenging topics, and the full time-table of lectures, tutorials and individual help provides the impetus for most students to complete the course successfully. There is also a change to see how advances in computing are affecting the way scientists use mathematics, and some experiments related to mathematical modelling.

Calculator You are expected to buy a calculator, which you will use as an aid to problem-solving and to investigate mathematical properties. The preparatory package tells you the minimum facilities you will need on it.

Students with disabilities If you have impaired sight, hearing or manual dexterity you may have some difficulty.

MS323

AN INTRODUCTION TO NON-LINEAR DYNAMICS

Third level: half credit

Dynamics is one of the important areas of applied mathematics and has applications in many sciences, for instance biology and chemistry as well as physics and engineering. The subject has changed dramatically in the past decade and it is now one of the most rapidly developing areas of applied mathematics.

This course is designed to give you the background knowledge you need to understand some modern developments. It will do this by using the simplest possible mathematics and by concentrating on relatively simple systems which behave, in some sense, typically; some simplification is achieved by concentrating upon Hamiltonian systems.

By the end of the course you should understand why some non-linear systems have complicated behaviour, as well as some of the approximate theories used in understanding their behaviour.

Content This course is an introduction to non-linear dynamic systems. But in order to keep the mathematics as simple as possible two main restrictions are made. First, we concentrate mainly on Hamiltonian systems and second, we deal only with systems having one degree of freedom, that is systems with a two-dimensional phase, or state-space. These simplifications enable us to go a long way in understanding the complex behaviour of non-linear systems using quite simple mathematics.

The course starts by discussing the behaviour of the solutions of ordinary first-order differential equations, with the emphasis on the qualitative description of their behaviour. This theory is extended to general systems of two coupled first-order equations, again with the emphasis on the qualitative description of their solutions. After this we specialize on conservative Hamiltonian systems and show how, for these systems, the global behaviour of the solution can be obtained without solving any differential equations.

Until this point the course has considered only the solutions of the equations of motion. Next, it briefly tackles the formulation of these equations; for this it is necessary to understand some aspects of the relation between the Lagrangian and Hamiltonian formulations of dynamics and how the equations of motion, for some systems, can be derived in the Lagrangian representation.

If the equations of motion depend explicitly upon time, the motion is generally much more difficult to understand and describe: to make a start on this problem it is necessary to develop methods of changing co-ordinates in phase space without changing the essential Hamiltonian structure of the system. These are named canonical transformations: this theory and its application to find the angle-action variables is developed in order to understand the more complex behaviour mentioned above.

These techniques are then used to understand the motion of several types of time-dependent problems. First, we use perturbation theory to describe the effect of resonant forces on a non-linear oscillator. Second, we introduce the ideas of adiabatic invariance to deal with a system having slowly varying parameters. Finally, we consider the opposite extreme of a system acted upon by a rapidly varying force; in this case we demonstrate how a vertical pendulum can be made stable when pointing upwards if its support is shaken fast enough.

These time-dependent problems show some, but not all, of the behaviour exhibited by non-linear systems. In order to demonstrate the diverse and exceedingly rich behaviour of non-linear systems the last few units are devoted to the behaviour of discrete dynamical systems, that is systems for which the 'time' or independent variable is discrete rather than continuous. These give rise to iterative systems rather than differential equations. As at the beginning of the course we introduce this subject by examples with one dependent variable, in particular the logistic map; we then progress to area-preserving maps. In both cases it is shown how simple deterministic systems can display chaotic, or statistical, behaviour.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisite MST204.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Students with disabilities We hope that course material will be available on tape in 1992.

MST204

MATHEMATICAL MODELS AND METHODS

Second level: full credit

This is the principal second-level applied mathematics course for mathematics, science and technology students.

The course teaches the use of mathematics in solving real problems. Half of the course is about representing suitable aspects of the real world by means of some mathematical model; the other half is about mathematical methods that are useful in working with such models.

Content The 'modelling' half of the course includes nine units on mechanics, starting with Newton's laws of motion and their consequences for a particle in one dimension, continuing with vibrations of such a particle, the mechanics of particles and systems of particles in three dimensions, the vibrations of systems of particles and the motion of rigid bodies, and ending with planetary orbits. This mechanics component of the course includes experimental work at the residential school. There are also two units on non-mechanical models: population models and heat transfer. Finally, this half of the course includes forty hours of project work in which you do an extended piece of mathematical modelling yourself. You are offered a choice of problems of non-mathematical origin; your task is to use mathematical modelling to help solve the chosen problem, to test your conclusions against real data, improving the model where necessary as a result, and to write a report. You will receive considerable help with this task from the course text, as well as having the opportunity to discuss your project with your course tutor. Project work is also an important part of the residential school programme.

In the 'methods' half of the course there are, first of all, four units on differential equations starting with first- and second-order differential equations, going on to simultaneous differential equations and ending with an introduction to partial differential equations. There are four units on mathematical methods for three-dimensional problems: one on vector algebra, two on partial differentiation and vector calculus and one on multiple integrals; most of this work will already be familiar to those who have done MS283. Four units deal with topics in algebra: complex numbers, linear algebraic equations, matrix algebra and eigenvalues. Finally, four units are concerned in one way or another with approximations: recurrence relations and their use in the numerical solution of differential equations, other approximation methods, Fourier analysis. As well as the numerical mathematics in these units, there is also some in the units on differential equations, linear algebraic equations and linear programming and eigenvalues.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M201] and [MST282].

Recommended prerequisites A pass in M101, or a pass at Grade 1, 2 or 3 (not Grade 4) in either [MS283], MS284 or TM282. The science and technology foundation courses contain useful background material but neither is a recommended prerequisite.

Related courses MST204 is a recommended prerequisite for M371, MST322, M372, SMT356, SMT355, T233, T326, MS323 and T394. It should fit well into any programme of study in mathematics, science or technology, particularly if the programme includes M203 or [T232]. If you intend to study SMT356 or SMT355, S271 is an ideal precursor, as it covers the necessary physics background.

Assessment (i) TMAs 01-03, 05-07 (25%), (ii) CMAs 41-47 (12½%), (iii) project TMAs 04 and 08 (12½%) and (iv) the examination (50%). Substitution can apply up to two TMAs and two CMAs but not to the two project TMAs. There will be a threshold of 20% on the project.

Calculator You will need a scientific calculator.

Residential school A one-week course-based summer school. This includes a variety of activities: lectures, tutorials and exercise classes on the mathematical methods and standard models taught in the course; one or two mechanics experiments and associated modelling; an opportunity to discuss the

project work with fellow students; computer work relating to the numerical mathematics in the course.

Broadcasts and cassettes The thirty-two TV programmes are an integral part of the course. There are eight audio cassettes.

Students with disabilities If you have any physical disability you should consult either the Office for Students with Disabilities, your Regional Centre or your tutor counsellor about the use of the computer, the project and the residential school.

MST322

MATHEMATICAL METHODS AND FUND MECHANICS

Third level: half credit

This course introduces the fundamentals of fluid mechanics and discusses the solution of fluid flow problems (i.e. the flows of liquids and gases) which are modelled by differential equations. Half of the course is about modelling simple real fluid flows; the other half is about the mathematical methods associated with such models. The methods are prompted by and interpreted in the context of fluid flow problems although they can also be applied in other subjects such as electromagnetism and the mechanics of solids.

The main objectives of the course are to continue the teaching of differential equations begun in MST204; to introduce and solve three

partial differential equations: the diffusion equation, Laplace's equation and the wave equation; to give a good working knowledge of the basic models in fluid mechanics; to apply the methods taught in the course to fluid flow problems.

Content In simple terms we think of a fluid as a substance that flows. Examples of fluids that are very familiar are air (a gas), and water (a liquid). All fluids are liquids or gases. The analysis of the forces in and motion of liquids and gases is called *fluid mechanics*.

Because of its many applications fluid mechanics is important for applied mathematicians, scientists and engineers. The flow of air over objects is of fundamental importance to the aerodynamicist in the design of aeroplanes and to the motor car industry in the design of cars with drag-reducing profiles. The flow of fluids through pipes and channels is also important to engineers. Fluid mechanics is crucial to the meteorologist in studying the complicated flow patterns in the atmosphere.

To solve even simple fluid problems requires some skill in solving the partial differential equations of applied mathematics such as Laplace's equation, the wave equation and the diffusion equation.

The course consists of fourteen units and is arranged in four blocks. The first block (Units 1-4) is the foundation on which the rest of the course is built. Unit 1 introduces some of the physical properties of fluids and the continuum model of a fluid. Unit 2 develops further the analytical and numerical methods of solving ordinary differential equations which were begun in the prerequisite courses. Unit 3 gives an introduction to the solution of first-order

partial differential equations and introduces the method of dimensional analysis. Unit 4 links line, surface and volume integrals through Stokes' theorem and the divergence theorem.

The second block (Units 5-8) starts by investigating the motion of a fluid that is assumed to be incompressible (i.e. cannot be reduced into a smaller volume) and inviscid (i.e. there is no internal friction). All real fluids do exhibit some form of compressibility and viscosity and their effect on the flow of fluids is investigated towards the end of the block. Unit 5 develops the equations of motion for the simple incompressible, inviscid model and the appropriate boundary conditions. Unit 6 solves these equations for flows in pipes, channels and through apertures. Unit 7 introduces the idea of a vortex and the effects of viscosity on the flow of a real fluid. Unit 8 develops a mathematical model for the forces due to viscosity and modifies the differential equations of motion by including these forces. The unit concludes by showing how the rather complicated equations of motion can be simplified by introducing non-dimensional quantities such as Reynolds number.

Block 3 investigates the solutions of second-order partial differential equations. Unit 9 shows that a second-order partial differential equation can be classified into one of three forms: elliptic, hyperbolic and parabolic. Examples of these forms are given as models for fluid flows. The method of separation of variables for solving partial differential equations is then introduced.

Unit 10 introduces and develops the properties of power series and Fourier series. Unit 11 extends and generalizes the ideas of Unit 10 with an introduction to Sturm-Liouville theory. The last unit in Block 3 (Unit 12) uses the ideas

introduced in Units 10 and 11 in the solution of Laplace's equation. These solutions are then used to investigate, for example, the flow of a fluid past a cylinder and a sphere. The last block (Units 13 and 14) is about waves. Unit 13 investigates some of the methods of solution of the wave equation. Unit 14 applies these solutions to mathematical models of water waves.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Either MST204 or [M201] with [MST282]. Students who were awarded a Grade 3 or 4 pass in such courses may find MST322 particularly difficult. A revision booklet is included as part of the course material to act as a refresher on the important parts of the prerequisite courses. The science and technology foundation courses contain useful background material but neither is a recommended prerequisite.

Related courses MST322 shows the application of mathematics to a branch of science and technology and should fit well into a programme of study in mathematics, science or technology, particularly if the programme includes MST204, [T233], S271, T331, [SM352] or SMT356. T331 could be taken in parallel with MST322.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Cassettes The course includes a two-hour returnable video cassette (VHS) as part of the teaching material to give a visual description of the flows discussed in the course texts. There are also audio cassettes.

Students with disabilities If you have impaired vision you may have some difficulty in studying the video part of the course. Course and supplementary materials are not available on tape.

OVERVIEW

Undergraduate courses provided by the Science Faculty serve three purposes:

- To provide a broad coverage of courses in the four discipline areas for a 'general' degree in science.
- To provide enough courses at third and fourth levels in each discipline for you to achieve some measure of specialization (see Figs. 1-4) and/or an honours degree.
- To provide courses, including U-courses, accessible to anyone who is interested in studying some science as part of a broader degree.

The Faculty is also developing its provision in certain areas of general scientific interest and has chosen health studies, environmental science, science education, and astronomy and planetary science for this purpose. Information about courses offered in these areas is available from the Faculty. A leaflet about the astronomy and planetary science area can be obtained by sending a stamped addressed envelope (marked A & PS) to Dr Barrie Jones, Physics Department, The Open University, Milton Keynes MK7 6AA.

Links between all the courses offered by each department, and between science courses and those from other faculties, are shown in Figs. 1-4 and in the Tables of Related Courses.

Science course prerequisites

The following advice applies to all courses with S as the first letter of the course code, and is particularly important now that a second foundation course is optional. You should treat the recommended prerequisites included in the course descriptions in the Table of Undergraduate Courses 1992 and in Figs. 1-4 very seriously. Post-foundation science courses assume that you have achieved the objectives of the specified prerequisite courses, and build on these. If you have not studied and passed a prerequisite course, but feel you have already acquired the necessary knowledge and skills elsewhere, then you should make quite certain that you consult your tutor-counsellor, or the science staff tutor at your Regional Centre, to make sure.

This advice is especially important if you wish to study post-foundation physics courses where mathematical competence is stressed at second level, and is essential at third level. Some third-level courses, for example S330 and S365, list only S102 topics as assumed knowledge, but the new concepts in these courses are introduced, taught and assessed at third level. It is assumed that you will have had experience in at least one related discipline area at second level before making the conceptual jump to these third-level, multidisciplinary courses.

Home kits and course quotas

Many courses have home experiment kits, most of which contain items that may not be taken out of the UK. Some courses with kits are very popular (for example, S236 and S271), and because we have a limited number of kits we can accept only a restricted number of students each year.

Residential schools

Studying science courses inevitably means doing some practical work so, as well as home experiment kits, many courses require attendance at a residential school. Because practical work is essential to the comprehension of the subject, as well as to the external credibility of Open University science courses, the University is not generally sympathetic to requests for excusal from attendance at science residential schools, especially when excusal has been granted from a previous science school.

If you know in advance that you are unlikely to be able to attend a science residential school, it is not wise to register for the course.

When a discipline-based residential school serves two related courses (for example, S246 and S247) it is advantageous, though not necessary, to study both courses simultaneously.

Alternate presentation of courses

The Earth sciences department intends to present its related third-level courses, S338 and S339, in alternate years as follows:

1992 S339 available, S338 withdrawn
1993 S338 available, S339 withdrawn

Fig. 1 Study guide for biology courses available in 1992.

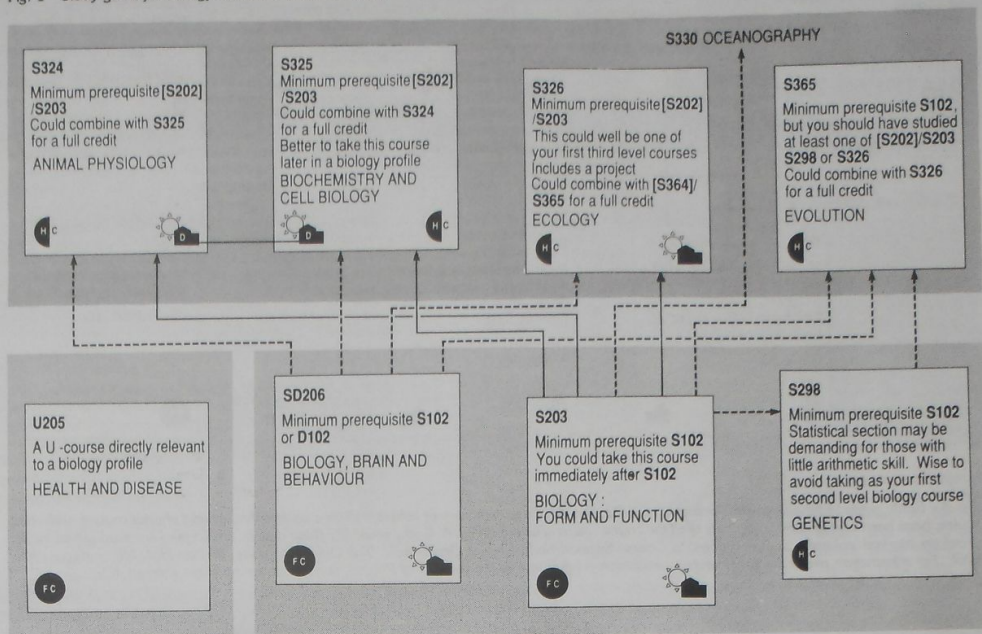
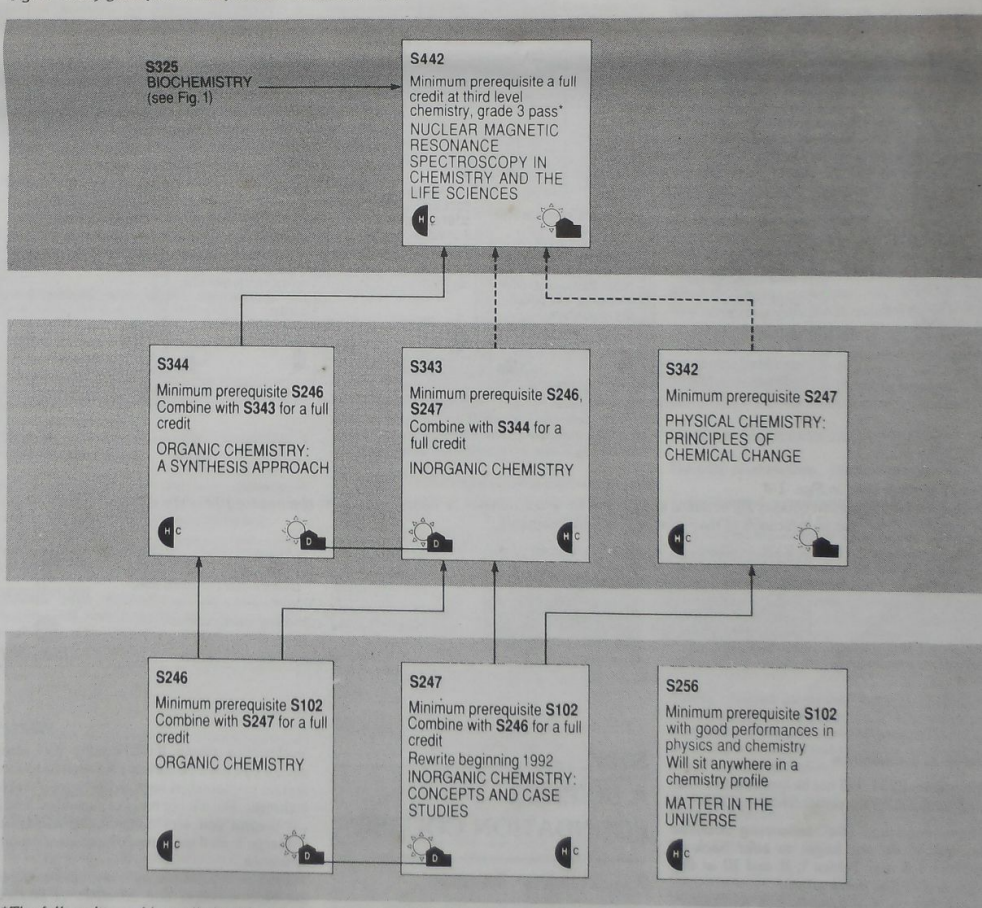


Fig. 2 Study guide for chemistry courses available in 1992.



*The full credit would usually be taken from [S341], S342, S343, S344 or [S304].

Fig. 3 Study guide for Earth science courses available in 1992. S237 is not available in 1992 but will be rewritten for 1993.

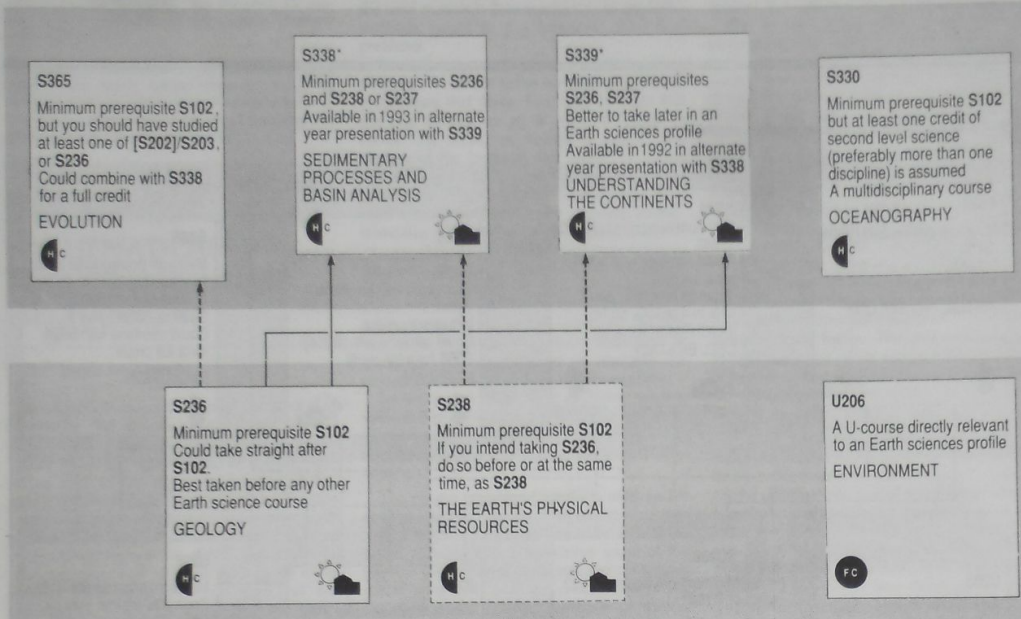
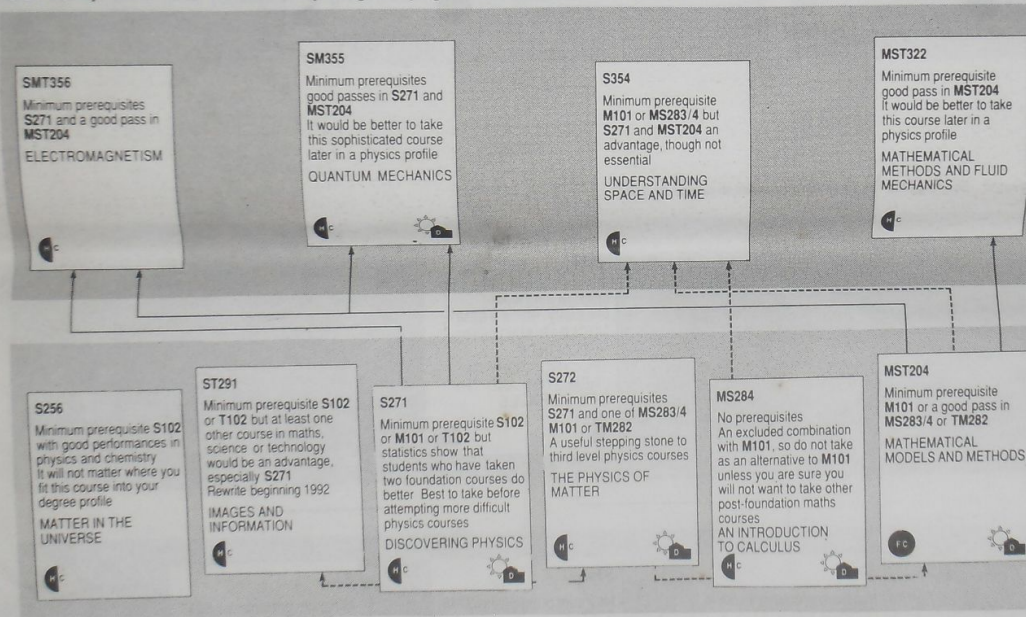
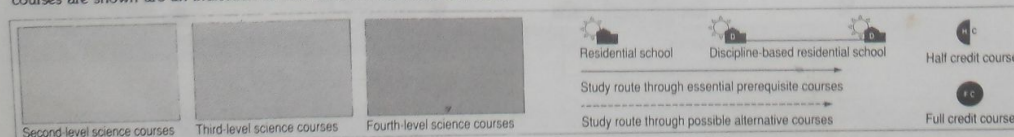


Fig. 4 Study guide to physics courses available in 1992. Details of a wide variety of coherent degree profiles that include physics courses, with study routes, have been sent to current students of all the courses starting with S in Fig. 4. If you would like these details, send a medium-sized self-addressed envelope marked 'coherent degree profiles' to Course Support Staff, Physics Department, The Open University, Walton Hall, Milton Keynes MK7 6AA. For information about the membership recognition programme at the Institute of Physics, send a similar envelope marked 'IOP'.



Key to symbols used in Figs. 1-4

Dashed outlines represent courses still available in 1992 but for which remakes or partial rewrites are planned for 1993. The different levels at which courses are shown are an indication of their relative intellectual demands.



Breaks in presentation

One course, S237, will not be available in 1992. It will be rewritten for presentation in 1993.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for Prospective Students' discontinued courses are identified by square brackets; their titles and dates of presentation are listed in Table III.

S102

A SCIENCE FOUNDATION COURSE

Foundation level: full credit

S102 is designed both for those who do not expect to study science beyond foundation level and for those who intend to go on to higher-

level science courses. It will be within your reach even if you have no formal education in science and no mathematical knowledge beyond simple arithmetic. But it is not trivial or superficial, and it will present you with a stimulating intellectual challenge even if you already have qualifications in science.

S102 introduces, explains and uses many of the basic concepts and principles of physics, Earth sciences, chemistry and biology. Our intention is that, when you have taken the course, you should be knowledgeable about a

wide range of modern scientific theories and familiar with some of the techniques of experimental work in science.

Content Consider these questions:

- What is genetic fingerprinting and how can it be used?
- How did the Universe begin?
- What is the greenhouse effect and why could it lead to climatic problems?
- Why is there a hole in the ozone layer?

In S102 these questions (and many others) are answered scientifically. The course covers four scientific disciplines — physics, Earth sciences, chemistry and biology — and we show how they are interrelated and point out what is common and what is specific to each discipline.

The course begins by considering very familiar observations such as the alternation of day and night, the changing phases of the moon and the cycle of the four seasons. We explain how these observations can be understood in terms of simple scientific models of the solar system (that is, the sun, its surrounding planets and other nearby matter). Next, we consider in detail the concept of measurement (you will actually measure the distance between the Earth and the moon) before introducing simple scientific laws that enable us to understand motion, force and gravity. This discussion leads us to consider the Earth itself, in particular its internal structure and composition, which can be investigated in detail through measurements of the effects of earthquakes. In the next two units a scientific theory is used to explain many diverse features on and within the Earth. For example, why earthquakes and volcanoes occur mainly in certain zones, and why the remains of marine animals have been observed in rocks at the top of Mount Everest.

The course then considers energy and light, and in the next unit our knowledge and understanding of light is used to make a detailed investigation of the structure of atoms, the tiny 'building blocks' of matter. There are in all about a hundred different kinds of atom. In the millions of chemical changes that occur around us (and within us), atoms change partners and the different partnerships give rise to substances as different as salt, sand, water and petrol. Certain very complex groupings of molecules have properties that enable them to be regarded as living organisms. By considering the materials which make up animals and plants we discuss which aspects of living matter distinguish it from inanimate (non-living) objects. We learn how organisms become adapted to their environment by a process of evolution, how they grow and reproduce. The fundamental building block of organisms is the cell and its structure and function is described in some detail. We discuss how organisms work (physiology) using examples of human biology, and through genetic mechanisms we give you an insight into the fascinating world of genetic engineering. In the next unit you see how each individual shares the environment, how finely balanced that environment is and how easily it can be destroyed.

Next, turning to rocks and minerals — inanimate matter on the Earth's surface — the ages of rocks are estimated. This shows how the ages of the Earth and solar system can be determined. We look at different types of fossil and see how they can be used as evidence of past environments and ancient life forms.

The last part of the course is about the structure and behaviour of atoms and their constituents. This is a subtle and fascinating branch of science in which many of the results of experiments contradict common sense. One of the theories that is needed to understand these extraordinary results is quantum mechanics, which is applied to atoms in order to derive insights into atomic structure. Finally, quantum ideas are used again when we look into the recent discoveries of high-energy physics (i.e. sub-atomic and sub-nuclear physics) that have made this branch of science one of the most exciting fields of human endeavour.

As you can see, S102 covers a very wide range of topics. The content is detailed and the insights the course will give you into modern science will enable you to appreciate the exciting and enormous scope of scientific enquiry. Indeed, whatever your previous training in science, S102 will increase and enrich your understanding of the world about you.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S100], [S101].

Assessment (i) Eight TMAs (33%), (ii) ten CMAs (17%) and (iii) the examination (50%). Substitution can apply and is explained in the Course Introduction and Guide.

The examination is computer marked and covers all

four disciplines: physics, chemistry, biology and Earth sciences. You will be sent a specimen examination paper during the year to give you an idea of the structure and level of the paper.

Broadcasts Television is especially important in teaching science because so much of science is visual and dynamic, and also because we can use television to take you into laboratories or out into the field and have you join with us in making observations and measurements. The television programmes were made on the assumption that you have, or have access to, a colour television. The thirty-five programmes are linked very strongly to the other course components, so you will be at a disadvantage if you cannot receive them.

Cassettes We make extensive use of audio cassettes, which are usually used in conjunction with illustrations in the units and enable us to talk through certain important topics in the course. You will be expected to provide your own cassette player but you will not have to return the cassettes.

Calculator You will need a calculator for some of the course work and we will advise you about a suitable type.

Home kit You cannot learn science without doing experiments. In S102 you will be doing experimental work directly, with the home experiment kit and in the laboratories at the residential school, as well as indirectly through the television programmes. (You will receive the kit in two parts.) With this apparatus you will be able to carry out a wide range of experiments and observations in biology, chemistry, Earth sciences and physics. This kit may not be taken or sent outside the United Kingdom.

Residential school The one-week course-based summer school gives you the opportunity to work intensively in the laboratories of a residential university. There are also tutorial classes, films and opportunities to meet staff and students in informal surroundings.

Computer-assisted learning (CAL) There are three optional CAL programs to help you understand and revise some topics in chemistry. These are available at the residential school, and you can also buy them to use throughout the course on a home computer. Although these programs are helpful, you can complete S102 successfully without using them.

Students with disabilities We will do everything we can to enable students with severe disabilities to take S102.

Those with visual handicaps are advised to ask the Office for Students with Disabilities for more detailed guidance. Attendance at the residential school is essential.

Preparatory work You will need to be competent in basic numerical and mathematical skills. In the autumn before you begin S102 you will be sent a preparatory mailing containing booklets on mathematics linked with four short TV programmes. The TV programmes are designed to help you make the best use of the booklets and will be transmitted before the course begins. Transmission times will be given in the preparatory mailing. The starting point of the preparatory material is simple arithmetic. As well as the booklets the mailing will contain a diagnostic test of simple mathematics which will indicate exactly what mathematical skills we expect you to have at the start of the course and enable you to decide in which areas (if any) you need to do some preparatory work. If you are concerned about the level of mathematics required for S102, either at this stage or before conditionally registering for the course, consult a science staff tutor at your Regional Centre. A booklet, *Preparing for the Science Foundation Course*, and an audio cassette are also included in the preparatory mailing to introduce some of the study skills used in the course.

S203

BIOLOGY: FORM AND FUNCTION

Second level: full credit

The course provides a good cover of general biology for students who do not take any other biology courses and it also teaches basic biology for those who do wish to go on to any of the third-level biology courses. The aims of the course are:

- To introduce the principles of taxonomy and to review the diversity of living organisms.
- To explore the relationship between structure and function in plants and animals and their cells.
- To explore cell/cell interactions and the basic features of differentiation and development in plants and animals.
- To demonstrate problems of living in selected environments and the physiological mechanisms which allow organisms to survive in various physico-chemical conditions.
- To investigate the evolution of physiological mechanisms and to demonstrate the importance

of regulation and control in homeostatic processes.

By the end of the course you will have acquired some of the skills appropriate to intending professional biologists, such as using principles given in the course to suggest and test hypotheses; communicating ideas and conclusions about biological topics and the results of your own investigation; recalling facts, theories and generalizations introduced and developed in the course.

Content Three themes underlie the course: energy relationships, structure-function relationships and mechanisms of regulation and control. There is a general emphasis on adaptation to environment. The course consists of five books and study guides.

Book 1 Diversity of organisms (3 unit equivalents) The course starts with study of the diversity of organisms and introduces micro-organisms, plants and animals. Some of the biological factors that have promoted and maintained such a huge variety of organisms are examined, and reference is also made to examples from recent research that have helped to provide an explanation for diversity. The book ends with a detailed summary of the anatomy, life history and taxonomy of the most abundant and diverse groups of plants and animals.

Book 2 Cell structure, function and metabolism (6 unit equivalents) The unifying features characteristic of all organisms are demonstrated by study of cell structure and function. The dynamics of cell metabolism are examined with special emphasis on enzymes as regulators and cell membranes as regulatable barriers.

Book 3 Animal physiology (11 unit equivalents) considers the parts played in regulation and control of reproductive cycles and of homeostasis by hormones and nerve cells. There is study of respiratory and circulatory systems, then feeding, digestion, and excretion and osmo-regulation. Special emphasis is given to mammals and insects, but many references to other groups of animals are made.

Book 4 Plant physiology (6 unit equivalents) begins with plant structure, photosynthesis, ion uptake and transport of nutrients, followed by water relations. Cell growth and development in plants are illustrated by consideration of the life-cycle of flowering plants from germination to seed production.

Book 5 Development (5 unit equivalents) Developmental biology follows with a discussion of the processes of growth, cell differentiation and morphogenesis in terms of the properties of cells and their interactions which result in the integrated form and function of the mature organism.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S202], [S221], [S223], [S225].

Recommended prerequisites [S101] or S102.

Complementary and related courses S206, S298, S324, S326, S325, [S364], U205.

Assessment Eight TMAs, eight CMAs and the examination.

Broadcasts and cassettes Thirty television programmes and five audio cassettes.

Home kit The home experiment kit includes a microscope and a balance.

Residential school The one-week course-based summer school gives you practical experience and includes experimental work on plants and animals.

Academic Computing Service Computer exercises are planned on parts of the course.

Students with disabilities Those with visual disabilities will have particular difficulties but others should cope with most of the essential parts of the course as long as they have adequate help.

S236

GEOLOGY

Second level: half credit

This is the core Earth sciences course at second level. It gives a practical introduction to geology by making use of a kit with a polarizing microscope, rock thin sections, minerals, fossil casts and geological maps. Anyone who has an interest in the physical landscape should find this course interesting.

Content

Block 1 Maps (3 units) briefly considers the relationship between the landscape and the underlying rocks, with illustrations from different parts of Britain. The main part of the block looks at geological maps in detail and shows how they can be interpreted systematically.

Block 2 Earth materials (2½ units) looks at rocks and minerals and introduces the techniques by which they can be described, identified and classified, both in hand specimen and in thin section using the polarizing microscope.

Block 3 Internal processes (3 units) The first half describes the formation of igneous rocks. The second half considers how rocks deform and shows how large-scale tectonic processes are reflected in small-scale deformation features like folds and faults. Metamorphism, the recrystallization of materials under high temperature and pressure, is considered in relation to the conditions that characterize particular tectonic environments.

Block 4 Surface processes (3 units) The first part establishes the basic principles of sedimentology while the second examines how sedimentation takes place in different surface environments. The block concludes with a look at the global pattern of sediment deposition.

Block 5 Fossils (3 units) starts by considering the invertebrate fossil groups and trace fossils and shows how the fossils in the home kit can be identified and how the way of life of the organisms that they represent can be interpreted. The rest of the block considers the fossilization process and explores the ways in which geologists can make use of fossils by illustrating their use in reconstructing past communities, environments and geographical distributions, while the last part emphasizes their value in evolutionary studies and in stratigraphical correlation.

Block 6 Historical geology (1½ units) summarizes the most important events in the geological history of the British Isles over the last 2000 million years.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S23-].

Recommended prerequisites You will be expected to have completed S102 or to have an equivalent background in science, especially Earth sciences.

Complementary and related courses S236 is a prerequisite for the third-level Earth science courses S338 and S339. It will also provide useful background for S330 and S365.

If you are considering taking other second-level Earth science courses (either S237 or S238 or the remakes of these two courses S267 and S268) it is probably best to take S236 first. S237 will not be presented in 1992; a revised version of it should be available from 1993.

Assessment (i) Four equally weighted TMAs (30%); (ii) five equally weighted CMAs (20%); and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Tuition Tutorials will concentrate on the first three blocks of the course before the residential school. They may include practical sessions and a field trip but the details will vary from region to region.

Broadcasts and cassettes Sixteen TV programmes, used to provide the 'fieldwork dimension' and to illustrate the course texts. Colour television will be an advantage and is recommended to give the maximum effect.

Six hours of audio cassettes with printed colour-plate booklets are used mainly to aid understanding of difficult text sections, help introduce the practical work by providing step-by-step instructions, and enrich main text materials by dealing with interesting peripheral subjects.

Home kit The home experiment kit contains geological maps, a polarizing microscope, rock and mineral specimens, rock thin sections, plaster casts of fossils and a compass clinometer. It is used extensively in Blocks 1, 2 and 5 and to a lesser extent in Blocks 3 and 4. This kit may not be taken or sent outside the United Kingdom.

Residential school A one-week course-based summer school at Durham University, devoted to fieldwork in a variety of places in Northern England. The week's programme will also include several laboratory-based sessions to support the fieldwork.

Students with disabilities The course requires detailed work with rock and fossil specimens, the microscope and maps, and so is unsuitable if you have badly impaired eyesight or colour vision difficulties, and may be a problem if you have severely impaired manual dexterity. The residential school fieldwork, which is an essential part of this course, may be extremely difficult if your mobility is significantly impaired and will be impossible if you are confined to a wheelchair.

Preparatory reading The following texts from [S101]: Units 6, 7, 26, 27 and 28, or S102 Units 7, 8, 27, 28 and 29.

Set books 1:625000 10-mile Geological Survey maps of Britain, North and South Sheets, 3rd edition (solid) 1979. Folded editions are probably easier to handle. These will be needed from the start of Block 1, so you must buy them before the course begins.

S238

THE EARTH'S PHYSICAL RESOURCES

Second level: half credit

Last presentation 1992 (to be remade for 1994)

Why is coal found where it is, and why is it so plentiful in Britain (or is it)? Why has china clay replaced tin and copper as the most valuable export from south-west England? Why does good drinking water cost one pound a litre in Saudi Arabia, where petrol costs 20 pence a litre? The answers to questions like these will become clear from studying this course. The availability, the economics and the methods of exploring for and extracting the Earth's physical resources are profoundly influenced by the geological setting in which they are found. S238 will show you the nature and extent of that influence.

The course has a strong topical appeal. Students who have taken it use phrases like 'relates to everyday life', 'relevant to the real world', 'practical approach', and 'makes one better informed on current news issues', to express their views about it. They have also shown great appreciation of the value of the course-based residential school.

As well as being part of the Earth sciences course profile, S238 is also particularly appropriate for those professionally concerned with economic and applied geology, the exploitation, use and management of resources, environmental and pollution control, and land reclamation.

Content The sixteen units are divided into six blocks. Block 1 introduces the concepts of resources and reserves, basic economic principles controlling their use, their economic history, their role in industrial society and the geological principles which govern the global distribution of resources.

Blocks 2-5 are the 'core' of the course and cover the formation and distribution of, the exploration for and the extraction and processing of the four main groups of resources. **Block 2 Constructional and other bulk materials** deals with the raw materials used in the construction and chemical industries. **Block 3 Ore deposits** is about the rocks from which metals are extracted. **Block 4 Water resources** discusses all aspects of water resources. In **Block 5 Energy resources** the main sections deal with coal, petroleum, nuclear power, and renewable energy resources. **Block 6** looks at predictions of the availability of and the demand for physical resources in the future, with special reference to the 'limits to growth' debate and the future demand for electric power in Britain.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S266], [S26-].

Recommended prerequisites You are expected to have completed [S101] or S102 or to have acquired an equivalent knowledge of science. You will also be expected to be able to use simple linear and logarithmic graphs and to perform simple calculations.

Complementary and related courses S236 would provide a useful geological background. If you intend to study both courses you are advised to complete S236 before S238. [S237] also complements parts of S238.

Tuition Tutorials concentrate on the study of Blocks 2-5. They may also include practical sessions or a visit to local sites of resource extraction (quarries, opencast or underground mines and reservoirs) but details will vary from region to region.

Assessment (i) Four equally weighted TMAs (30%); (ii) four CMAs, two of which are half-weighted (20%); and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts Seventeen TV programmes mostly filmed on location, about half of it abroad. The programmes illustrate the most difficult concepts presented in the text (such as the three-dimensional nature of deposits), raise the level of understanding of the material, and link many of the strands of the course with case studies.

Cassettes Four and a half hours of audio cassette time to be used in conjunction with printed colour-plate booklets.

Calculator A calculator is desirable.

Residential school A one-week course-based summer school will be held at the University of Nottingham. At least half the time will be spent on fieldwork at active research sites in the East Midlands. The rest will include the field and laboratory use of various exploration, evaluation and processing techniques, a group resource planning exercise and tutorials.

Students with disabilities If you have impaired mobility or manipulative problems you should be able to cope with all parts of the course; if your mobility is significantly impaired you may find the residential school difficult. It may be impossible if you are confined to a wheelchair. Some sections of the course may be extremely difficult if you have badly impaired vision.

S246 ORGANIC CHEMISTRY

Second level: half credit

Organic chemistry is an important subject that greatly affects our lives. All living things are mainly made up of organic material. The food we eat is organic, and so are many additives and preservatives. Most fabrics and dyes are synthetic organic compounds. The pharmaceutical industry is almost completely dependent upon organic chemicals. Controlling and maintaining healthy crops and livestock usually depends upon the skill of organic chemists. Organic compounds, in the form of coal, petrol and natural gas, are burnt to provide heat and energy for transport. Many environmental issues can be fully understood only in the light of organic chemistry. Clearly, a knowledge of organic chemistry is essential to an understanding of these and other aspects of everyday life.

The course gives an introduction to organic chemistry for those who have an interest in science. An important aim is to show how problems in such diverse areas as petrochemicals, polymers, pharmaceuticals and biological systems can be tackled using basic principles of organic chemistry.

Content The course comprises five blocks covering different aspects of organic chemistry. In each block the principal concepts and methods are established and applied to systems of particular relevance and interest.

One of the topics is how chemists design new drugs, or modify the active ingredient in traditional remedies to provide safer or more effective ones. In another study we look at complex natural molecules such as proteins and synthetic fibres such as terylene and nylon. These polymers are made by joining together thousands of simple molecules, often arranged in easily recognizable repeating units. We also examine how plants build up some quite complex compounds from simple starting materials, and the plant chemistry is shown to be analogous to much laboratory chemistry.

The course starts by surveying the origins and sources of organic compounds, and looks in some detail at their three-dimensional structures. We then examine the isolation of compounds and the determination of molecular structure. Structure determination relies heavily on a study of the interaction of radiation with matter and this subject, spectroscopy, is dealt with in some detail. This leads on to a description of how the atoms in molecules are bound together.

Having established the structure of organic molecules, we look at their reactions from a mechanistic point of view: we try to understand, at the molecular level, how reactions proceed, and the molecular features that affect reactivity. We show that with a few basic ideas we can explain many reactions occurring in the laboratory, the chemical industry and even in the cells of living organisms.

The course ends with a look at synthesis, arguably the highest form of art within organic chemistry. Synthesis is about building more complex molecules from simpler, more readily available starting materials. This topic brings together much of what has been covered in the earlier part of the course.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S24-], which it replaces.

Recommended prerequisite S102.

Tuition There will be tutorial classes and four

CALCHEM (computer-assisted learning in chemistry) programs. These programs will be available on disks.

Assessment (i) TMAs 01-04 (32%); (ii) CMAs 41-44 (18%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts Eight TV programmes, three audio cassettes, three hours of video cassette material and four radio programmes reporting on the CMAs.

Home kit The home experiment kit may not be taken or sent outside the United Kingdom.

Residential school A one-week discipline-based summer school, shared with S247.

Students with disabilities Although there is a fair amount of experimental work to be carried out at home and at the residential school, you should not be discouraged from taking this course. Please ask the Office for Students with Disabilities or the S246 course manager at Walton Hall for more information.

S247 INORGANIC CHEMISTRY: CONCEPTS AND CASE STUDIES

Second level: half credit

S247 is being rewritten and new material will be presented in 1992.

The course introduces contemporary ideas in inorganic chemistry: ideas which are not only required by those who have a direct interest in chemistry but which provide a basis for the study of several other courses. This course is at the centre of any degree programme that involves a molecular view of science.

The course is in seven blocks, varying from 3½ units for Block 4 to just over one unit for Block 7. The blocks are supplemented by four case studies, each about ¼ unit.

Content

Block 1 opens with the structure and reactions of metals. The industrial extraction of sodium, magnesium and aluminium is discussed, and the possibility of grading metals according to their 'reactivity' is explored. This idea is then examined quantitatively using thermodynamic concepts.

Block 2 covers the solid state. The concepts of lattices, unit cells and close-packing are discussed and illustrated through model-building exercises. Lattice energies are calculated theoretically and values compared with those obtained from the Born-Haber cycle.

Block 3 deals with the typical metals sodium, magnesium and aluminium, co-ordination chemistry and three bioinorganic topics: membrane transport, the role of haemoglobin and Wilson's disease.

Block 4 introduces the concept of symmetry and its application to bonding. The block starts with a treatment of valence shell electron pair repulsion theory for determining the shapes of simple molecules. This is followed by a description of symmetry elements, simple point groups and character tables. The combination of atomic orbitals to produce molecular orbitals in diatomic and polyatomic molecules is then examined, leading to band theory in metals and semi-conductors.

Block 5 relates the chemistry of the elements to periodic trends in the atomic properties (size, electron affinity, ionization energy and electronegativity). There is a discussion of the chemistry of the second row elements, hydrogen, the halogens and the noble gases.

Block 6 looks at rotational spectroscopy and then uses the symmetry concepts to study vibrational spectroscopy. Infrared and Raman techniques are used to establish the shapes of simple inorganic molecules.

Block 7 is about the chemistry of non-metals, mainly silicon, phosphorus and sulphur. The four case studies look at topics of current scientific or social importance, using principles learned in the course. They cover the thermochemical generation of hydrogen and its importance as a fuel; the use of photovoltaic cells in producing electricity from solar energy; the use of rotational spectroscopy in studying molecules in space; and the influence of phosphorus chemistry on the environment.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S25-].

Recommended prerequisites There is no formal mathematical requirement for this course, but it is assumed that you have studied the science foundation course.

Assessment (i) TMAs 01-04 (32%); (ii) CMAs 41-44 (18%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts Eleven TV programmes, transmitted at regular intervals, which are an important part of the course; it would be valuable, though not essential, to view in colour.

Home kit Experimentation is important in chemistry: there is a home experiment kit which may not be taken or sent outside the United Kingdom.

Residential school The one-week discipline-based summer school, shared with S246, has a large laboratory element.

Students with disabilities Although there is a fair amount of experimental work to be carried out at home and at the residential school, you should not be discouraged from taking this course. Please ask the Office for Students with Disabilities or the S247 course manager at Walton Hall for further information.

S256 MATTER IN THE UNIVERSE

Second level: half credit

Last presentation 1992

Astronomy is a wide subject which draws on many branches of science. This course introduces many aspects of astronomy, though it makes only brief reference to the origin and ultimate fate of the Universe. It should serve both those who intend to go no further with astronomy and those who regard it as the start of a deeper study.

- The aims of the course are:
- To describe the present 'layout' of the cosmos.
 - To outline how matter evolves on a cosmic scale from diffuse clouds of hydrogen and helium to yield all the forms of matter that exist in the cosmos today.
 - To develop the basic physics and chemistry you will need for the course, in particular nuclear physics/chemistry, and the various physical and chemical processes which operate within galaxies, stars, planets and interstellar clouds.
 - To describe the main observational techniques used to establish the nature of the objects in the cosmos, notably imaging and spectroscopy and analysis of acquired samples.
 - To introduce an active scientific endeavour in which the practical side is observational rather than experimental, and which draws on several traditional disciplines.

Content

Block 1 summarizes the general 'layout' of the cosmos, and introduces some of the observational equipment which has been used to study it.

Blocks 2-3 discuss the interstellar medium, its diverse nature, the (mainly spectroscopic) techniques by means of which it has been explored and the chemical and physical processes that operate within it.

Blocks 4-5 describe stars, how they form from the interstellar medium to yield a rich variety of types, their evolution, the nuclear processes that operate within them and the ultimate return of some of their material to the interstellar medium. The main techniques used to investigate stars are outlined.

Block 6 is about galaxies, vast and complicated structures in which most stars and the other forms of cosmic matter reside.

Blocks 7-8 introduce planetary systems, in particular our own solar system, and the various theories of the origin and evolution of planetary systems. An outline is given of the main techniques which have been used to study planetary systems.

The approach is largely descriptive. There is, however, some necessary use of mathematics at the level developed in S102. In particular, familiarity with graphs and with algebraic and

chemical equations is assumed, and you will be expected to perform a fairly large number of calculations.

Topics such as cosmology, positional astronomy, and making your own observations are not prominent in this course.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites S256 is firmly based on S102 and contains astronomy taught at second level and much new, underlying physics and chemistry. It is essential that you have a thorough grasp of the physics and chemistry units from S102. Units 2 and 3, 5 and 6, 9-18, 28-31, or [S101] Units 2-5, 8-17, 26, 28-30 or [S100] Units 4-8, 10-12, 22, 27-31. You should have obtained good grades on assignments relating to most of these units, or feel that you could obtain such good grades now. Mathematics is used fairly extensively and if you have not thoroughly grasped the mathematics in S102, you should not attempt S256. If you have not passed the science foundation course you should examine the units listed above, and only if you feel that you could grasp most of their contents fairly easily should you contemplate embarking on S256.

Complementary and related courses S256 is the cornerstone of Open University astronomy and planetary science, which has been chosen by the Science Faculty as an area for coherent development. At present the other courses in this area are S237, [S330], S354 and ST291. Outside this area, the physics content of S256 is dealt with more fully in parts of S271 and the chemistry content in S342.

It does not matter very much where S256 comes in the order in which you take courses, but you should note that most of the above courses carry more recommended prerequisites than does S256. However, the physics department considers that S256 is more demanding than S271, and you should bear this in mind when choosing your courses.

Assessment (i) Four TMAs (30%); (ii) five CMAs (20%); and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes There are eight TV programmes. Computer disks are available on request; they contain the CAL tutorial programs in a format suitable for the BBC microcomputer.

You will also be sent a two-hour video cassette, which you will be asked to use on at least three separate occasions throughout the course. Replay machines are available in some study centres in the UK; if you have access elsewhere to a VHS machine that would be an advantage. If you are unable to watch the video cassette, you can still complete S256 successfully.

Academic Computing Service There are three tutorial-type CAL (computer-assisted learning) programs. To obtain the full benefit you will need access to a BBC microcomputer. But if you cannot use these programs you can still complete S256 successfully.

Students with disabilities The absence of a home experiment kit and a residential school makes this course a good choice, though if you have a severe visual handicap and cannot make full use of the TV programmes and the video cassette you may have some difficulties. Course and supplementary materials are not available on tape.

Preparatory reading There is no set book for S256. If you wish to do some preparatory reading, there are some recent introductory texts on astronomy which you may find useful, for example M. A. Seeds (1988) *Foundations of Astronomy*, Wadsworth (2nd edition). Make enquiries at a good bookshop or, for a list of suitable texts, send a stamped addressed envelope to The S256 Course Manager, Physics Department, The Open University, Milton Keynes MK7 6AA. You could also revise S102 Units 10-12 (or [S101], Units 9-11 or [S100], Units 6, 7 and 28). But please note that we do not require you to do any preparatory reading.

S271 DISCOVERING PHYSICS

Second level: half credit

S271 is your introduction to physics. To understand many phenomena, it is necessary to have a grasp of the basic ideas of physics. For example, the paths of rockets and satellites can be explained in terms of Newton's ideas about motion and gravity; the laws of electromagnetism account for lightning, and quantum mechanics explains the structure of atoms and how a laser works.

S271 is designed for a wide range of students. You may want a brief taste of physics in order to satisfy your curiosity about the world around you or as a background to other science courses. If so, you can take S271 at any stage in your degree. On the other hand, if you may intend to specialize in physics, if so we recommend that you take S271 immediately after foundation-level courses.

Content Although the course does not have historical aims, the progress of the sixteen units mirrors the development of physics from the time of Newton to the most recent astrophysical speculations.

Unit 1 introduces some of the techniques of physics in a case study which establishes the distances to planets, stars and galaxies.

Units 2-5, a block on mechanics, examines questions such as: what is the path of a golfball; how much energy can be stored in a flywheel; how does gravity shape planetary orbits? The answers are found in the laws of mechanics expressed in the mathematics developed in Unit 2. Physics is largely framed in the language of mechanics (force, mass, momentum, energy, etc.) and one of the main tasks of this block is to introduce these important concepts.

Units 6-8 Underlying both chemistry and biology are the electromagnetic forces which bind atoms together. In this block the ideas of electromagnetism are developed with illustrations as diverse as lightning, plasma confinement and electrical energy storage.

Units 9-10 Looked at closely enough, everything — springs, violins, and atoms — is oscillating. In these units we introduce the general ideas of oscillations and waves that describe all these systems.

Unit 11 A first step into the microscopic world. The macroscopic concepts of heat and temperature are related to the invisible random motion of molecules.

Unit 12 deals with Einstein's special theory of relativity. You will see why your intuitive understanding of space and time breaks down for speeds close to that of light.

Units 13-15 Just as Einstein's work overthrew classical ideas of space and time, quantum theory requires us to abandon our conventional views of matter and light. This change in perception was the subject of anguished and prolonged debate but led to a consistent description of the structure of both atoms and nuclei.

Unit 16 uses the content of the course in an account of the physics of stars. Our sun is at present enjoying a long stable period, but ultimately all stars collapse into white dwarfs, neutron stars or black holes.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites The course assumes certain basic scientific and mathematical skills. For example, graphs, algebra and trigonometry are freely used without introduction. If you have successfully completed S102 and have enjoyed the physics-oriented units, you should have sufficient of these skills. S271 is also written so as to be accessible to students who have taken either M101 or T102. If you are in this group you should either have experience of basic physics and mathematics or have an ability to assimilate that material rapidly when it is re-taught.

Complementary and related courses S271 is a prerequisite for S272 and for the third-level physics course SM355; we also strongly recommend that you take it before embarking on SMT356. You will find that S271 forms a very useful background to S256, ST291 and to S354. A higher level of mathematics is required for S272, SM355 and S354 than for S271, and you could gain the necessary mathematics background by studying M101/MS284 and then MST204.

Assessment (i) Five TMAs (33.3%), (ii) five CMAs (16.7%), and (iii) the examination (50%). The residential school grade is included as TMA 05 for the purpose of assessment but there is no assignment. Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes The sixteen TV programmes have an important role and their content, summarized in the broadcast notes, is assessable. There are also five audio cassette tapes for use within the units.

Home kit There is a fairly simple home experiment kit that is used in conjunction with five of the earlier course units. Measurements are made on electrical and mechanical systems. This kit may not be taken or sent outside the United Kingdom.

Residential school A one-week course-based summer school with laboratory sessions and tutorials as well as the opportunity to perform computer simulations and watch course TV programmes.

Students with disabilities If you have severe manipulative or visual problems which would interfere with experimental work or your appreciation of complex diagrams, you will be at a serious disadvantage. The course manager and chair welcome enquiries if you would like more detailed advice about coping with S271.

S272

THE PHYSICS OF MATTER

Second level: half credit

Everybody knows that gases expand on heating, that rubber is very stretchy and that metals are good conductors of electricity. The physics of matter will tell you why. It also answers questions such as: what is it about silicon that has led to the silicon-chip revolution? How do temperature inversions in the atmosphere arise? Why do some liquids become superfluid at very low temperatures? The answers in all cases are obtained in terms of fundamental physical ideas.

Throughout the course the emphasis is on the consequences of general principles. That makes S272 a natural choice for all science and technology students who wish to understand the behaviour of matter at a fundamental level.

S272 is designed to follow on naturally from the introductory physics course S271, but it assumes a slightly higher level of mathematical knowledge, corresponding to the first twelve units of M101 and MS283. The course is carefully pitched at such a level that S272 is a valuable stepping stone between introductory courses like S271 and the more demanding third-level physics courses.

The course also shows the importance of experimental work in physics and teaches some essential experimental skills by means of television programmes and laboratory work at the residential school.

Content

Block 1 General preparation.

Unit 1 *Temperature, energy and the structure of matter* surveys the role of temperature in determining the structures and properties of matter. At high temperatures matter is in the form of a plasma; at low temperatures startling new effects such as superfluidity emerge. The methods used for attaining millikelvin temperatures are examined in the television programme.

Unit 2 *Macroscopic description of matter* Macroscopically the state of a sample of matter is specified by just a few variables: pressure, volume, temperature etc. The relationship between these variables can be represented by means of a surface, which provides a unified description of the properties of the substance and a map of its different phases.

Unit 3 *Microscopic models of matter* Deeper understanding requires that the macroscopic properties of matter be explained in terms of microscopic (atomic) models. This unit contrasts two quite different microscopic approaches to the modelling of matter: classical and quantum mechanics.

Unit 4 *The Boltzmann factor — sharing out the energy* introduces the Boltzmann distribution law which connects the microscopic models of Unit 3 to the macroscopic properties of Unit 2.

Unit 5 *Block 1 revision and consolidation*

Block 2 *Gases*

Unit 6 *Equilibrium properties of gases* deals with the properties of real gases with particular reference to the properties of the atmosphere (e.g. the speed of sound and the dependence of pressure and temperature on height).

Unit 7 *Transport properties of gases* discusses 'transport processes' (such as diffusion, heat conduction and viscous flow) by extending the simple classical gas model of Unit 3.

Unit 8 *Quantum gases — photons and electrons* Units 6 and 7 were about 'classical gases'. Unit 8 deals with the more exotic quantum gases, for example the 'gas' of electrons inside an electrical conductor and the 'gas' of photons that make up light. It turns out that neither of these 'gases' obeys Boltzmann's law (Unit 4), and the reason for this can be traced back to a fascinating aspect of quantum physics.

Block 3 *Solids*

Unit 9 *Structure and bonding in solids* This first unit of the 'Solids' block discusses techniques of structure determination and surveys a variety of microscopic structures, ranging from the ordered lattices of ionic crystals and metals, through liquid crystals to

amorphous materials such as glass. Microscopic models of these structures are then used to explain bonding and cohesive energies in solids.

Unit 10 *Mechanical properties of solids* looks at a wide range of phenomena from the tremendous stretchiness of a rubber band to the ductility of metals to the brittleness of glass, and attempts to model these phenomena theoretically.

Unit 11 *Thermal properties of solids* begins by discussing Einstein's pioneering work in using quantum theory to understand the specific heats of solids, which was one of his most influential contributions to twentieth-century physics. More advanced quantum models based on the concept of the phonon are then introduced and used to account for the thermal conductivity of solids.

Units 12 and 13 *Electrical properties of solids* The ability of metals to conduct an electric current and of plastics to prevent such a flow are of vital importance in our technologically-based society. These units explain why metals, semiconductors and insulators have such widely differing electrical properties. The units also explore the applications of semiconductors to several devices, including transistors and xerox machines.

Unit 14 *Block 3 Revision and consolidation*

Block 4 *Liquids*

Unit 15 *Classical liquids* Classical liquids are those in which quantum effects are negligible; all the liquids with which we are familiar in the everyday world fall into this class. Unit 15 describes both their equilibrium and their transport properties. A central theme is the determination of the 'structure' of liquids, a topic of current research interest.

Unit 16 *Superfluid* Liquid helium can have zero viscosity and superconducting metals have zero electrical resistance. This unit discusses these spectacular properties, with emphasis on experiments rather than detailed theory.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [ST285].

Recommended prerequisites A pass in S271 and a pass in one of the following: M101, [MS283], MS284, TM282. If you have only a Grade 4 pass in the recommended prerequisite courses you should consider carefully whether you ought to take S272. T281 students are advised that they need to do additional background reading from S102 and S271.

Assessment (i) Four TMAs (30%); (ii) five CMAs (20%); and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes Eleven TV programmes and four 90-minute audio cassettes.

Residential school A one-week course-based summer school, assessed by TMA.

Students with disabilities If you have impaired sight or manual co-ordination you may have difficulties with the residential school experiments.

S298

GENETICS

Second level: half credit

S298 is a broadly based course which introduces the principle concepts, theories and methods of present-day genetics and inheritance.

The course is centred upon three interrelated topics: the processes by which the characteristics of one generation are reproduced in the next — the heredity of organisms; the methods of analysis used in the study of heredity; and the theories that have been developed about heredity, and how both the inheritance of an organism and its environment contribute to the generation of its characteristics — the developmental history of organisms.

Content

Unit 1 introduces the main themes of S298 and provides a general view of the course. It not only revises and then builds on the material presented in the science foundation course but also gives a brief survey of how genetics and the study of heredity have changed over the last decade.

Units 2-5 deal with the structure and properties of the genetic material and with the ways in

which replication, repair and transmission of the genetic material are accomplished in different organisms.

Units 6-8 are about the control of the expression of the information encoded in the genetic material both in time and space, and how this control differs according to the complexity of the organisms concerned.

Units 9 and 10 describe the development of characteristics by organisms, drawing examples from a wide range of living organisms. The use of model systems to aid the analysis of development is considered.

Units 11 and 12 examine the genetics of populations and how experimentation and simple algebraic models can be combined to investigate the factors affecting gene frequencies in populations.

Units 13 and 14 build on the previous pair of units, and demonstrate how simple algebraic models can be useful when studying the genetic architecture of polygenic traits in populations.

Unit 15 occupies a special place in the course, for it not only brings together the principal ideas developed in the earlier units but also illustrates the synthesis, taking human beings as its main subject.

There are also two ancillary texts: *Hist*: which traces the history of genetics and its social interactions through the nineteenth and twentieth centuries; and *Techniques* which explains and illustrates some of the main experimental techniques used in modern molecular genetical research.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S299].

Recommended prerequisites It is assumed that you have studied S102 or have equivalent knowledge of basic biology.

Complementary and related courses It would be an advantage to have studied [S202/S203]. S298 is also relevant to S325 and S326.

Assessment (i) Four TMAs; (ii) six CMAs, together worth 50%, and the examinations (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes Ten TV programmes are linked with the units. They are an important part of the course because they demonstrate the experimental techniques and results of modern genetical research, as well as showing the living organisms referred to in the units. There are notes for all these programmes. Four audio cassettes contain material which reinforces the units or provides an alternative way of explaining points made in the text. There are notes to be used with the material on the cassettes.

Computing Optional CAL (computer-aided learning) programs are available on request on floppy disk for use on a BBC microcomputer. This CAL supports and enhances the material in the course, though it is not a compulsory part of it.

Home kit The kit contains the equipment with which to undertake some simple genetical experiments with tomato seedlings, with the breadmould *Neurospora crassa* and with the fruitfly. This kit may not be taken or sent outside the United Kingdom.

Students with disabilities If you have impaired vision or manual dexterity you will be at a disadvantage, particularly with the home experiments. Course and supplementary materials are not available on tape.

S324

ANIMAL PHYSIOLOGY

Third level: half credit

This course illustrates some of the recent advances in whole-animal physiology, and examines the ways in which the physiological systems of a whole organism are co-ordinated to enable it to survive in different environments.

Content The course should enable you to make use of knowledge and skill acquired at second level in the study of some aspects of animal physiology up to the current level of research. Second-level physiology (in [S202/S203]) puts more emphasis on the functioning of individual physiological systems. Our theme is that of *whole-animal physiology*, which considers how the responses of different animals relate to life-cycles, habits and habitats.

We develop this 'whole-animal' approach in each of the main sections of the course. In the first half, we follow an ontogenetic theme that considers how different physiological systems act together to cope with the different environmen-

tal problems encountered by animals at various stages of their life-cycle. The types of environment we consider therefore vary from the wall of the uterus, to the watery medium surrounding the foetus, to the comparative cold faced by the new-born, and finally to deserts and polar regions. Within this framework we look at other important physiological principles — interactions between the mother and the foetus and the gradual increase in physiological competence shown by the neonate. In the adult the main variable we consider is temperature.

Units 8-16 are concerned primarily with animal performance in relation to energy expenditure. We consider in mechanical terms the energetic costs and implications of different strategies animals use, particularly locomotion. The approach here again relates to the whole animal because we are considering its overall performance, especially in relation to its energy budgets.

The important principles of the course are taught using a wide variety of animal examples, but the emphasis will be on fish, reptiles, birds and mammals.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S321], which it replaced.

Recommended prerequisites The course is written on the assumption that you have taken both S102 and [S202] or S203, and we therefore strongly advise you not to undertake S324 without an [S202] or S203 credit. Other biology second-level courses are not essential.

Related course S325.

Assessment (i) TMAs 01, 02, and 04 (25%); (ii) project TMA 03 (10%); (iii) CMAs 41-44 (15%); (iv) the examination (50%). Substitution can apply to one TMA and one CMA but not to the project (TMA 03). The project is based on residential school work, but an alternative will be available for those not attending the school in the year in which they take S324 (see below).

Broadcasts and cassettes Ten television programmes, linked mainly with units in the latter part of the course. You must watch the programmes (in colour) in order to satisfy the course objectives. Many of the television programmes deal with the experimental techniques used to obtain the data discussed in the texts. There are also three hours of audio cassette material.

Tuition There are no home experiments, but the experimental work associated with the units is considered a vital part of the course. There will be one day-school which will provide an opportunity for experimental work. We hope that the day-school will take place in about a dozen centres, to reduce travelling distance. You will be at a disadvantage if you cannot attend.

Residential school The course shares a one-week discipline-based summer school with S325 *Biochemistry and cell biology*. Here you will have the opportunity to undertake an extended project investigating a practical problem in depth in a sophisticated 'research' laboratory. An evening programme will include video cassettes emphasizing physiological methods and techniques.

Project work on this course will require preparation of a TMA on your residential school investigations in the form of a scientific paper. If you do not attend the school in the year in which you take S324 you will have to prepare a similar report using supplied data and research papers.

Students with disabilities We expect no special problem, although disabilities which impair laboratory skills would present difficulties (e.g. little manual dexterity, marked visual handicap).

S325

BIOCHEMISTRY AND CELL BIOLOGY

Third level: half credit

Six topics in modern biochemistry and cell biology are presented as separate books, each building on the basic information in S203/[S202]. They show how an understanding of cell biology and biochemistry relates to problems in modern medicine, agriculture and industry, and how the techniques commonly used in research laboratories have led to advances in knowledge. The course also introduces the skills of experimental design, interpretation and handling of biochemical data, critical assessment of review papers and scientific literature.

Content The six book topics have been chosen to illustrate different aspects of three fundamental concepts: regulation and control at

molecular and cellular levels, the links between structure and function, the energy dependence of cellular activities.

The *muscle metabolism* book brings together a description of molecular structure and metabolic potential for a single tissue (vertebrate muscle), relating these to its physiological role in the whole organism in health and disease.

The *cell architecture* book outlines recent advances in the study of protein and nucleic acid structure. It shows how the spontaneous self-assembly of these macromolecules produces recognizable features of cell architecture; it looks particularly at chromatin and tubulin (cytoskeleton) and factors controlling assembly-disassembly during the cell cycle.

The *gene expression* book shows how genetic material is organized, and its expression controlled, in viruses, bacteria and higher organisms. A substantial part of the book introduces the recently developed techniques of genetic engineering.

The *microbial metabolism* book examines the diversity of structure and function of micro-organisms (bacteria, micro-fungi and algae) in relation to their increasing importance as producers of antibiotics, alcohol, etc. The tremendous industrial potential of microbes with the advent of genetic engineering is emphasized.

The *receptors* book examines ways in which animal cells communicate with one another using the nervous and hormonal systems. The case study discusses various types of signal molecules, their receptors and the ways in which they interact.

The *immunology* book outlines molecular and cellular responses of the immune system to invasion by foreign material, giving you the basic information you need to follow developments in this rapidly moving field. It discusses medical aspects of immunology and the use of immunological techniques in medical diagnosis and in basic biological research.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S322].

Recommended prerequisites S102 and [S202]/S203. The course builds directly on [S202]/S203, and if you were happy with the cell biology in that course (Units 4-10) you should have no problems with S325. However, if you found these units difficult, particularly the chemistry in them, you are strongly advised to take a second-level chemistry course (S246 or S247) before embarking on S325.

Complementary and related courses [S202], S298, S324, S341.

Assessment (i) TMAs 01-02 and 04 (25%); the project, TMA 03 (10%); (iii) CMAs 41-43 (15%); (iv) the examination (50%). Substitution can apply to one CMA and one TMA in (i), but not to the project, TMA 03. The project is based on residential school work, but an alternative is available for those not attending the school.

Tuition There are no home experiments but one intensive four-hour tutorial session may be used to illustrate experimental techniques, to allow you to perform a short experiment, and to discuss handling of experimental data.

Broadcasts and cassette A returnable video cassette contains material designed to elucidate selected passages of the books, presenting conceptually difficult material in an alternative form. You should arrange to have a video recorder for at least two study sessions during the year. There are also eight television programmes.

Residential school The experimental part of the course is completed at a one-week discipline-based summer school shared with S324.

Students with disabilities Students with impaired manual dexterity may have difficulty in manipulating pipettes, syringes and other apparatus at the residential school. Those with a visual handicap are warned that many of the course components are difficult to transcribe onto tape, because they rely heavily on complex diagrams. Course and supplementary materials are not available on tape.

S326

ECOLOGY

Third level: half credit

The study of ecology encompasses all aspects of the interactions of organisms with one another and with their environment, and so is an important part of biology. This course examines the biological principles which form the basis for analysing and understanding ecological situations.

We want you to become aware of the complexity of interrelationships between living organisms and to acquire some of the skills and knowledge needed by professional biologists. The experimental approach is stressed as the one most likely to lead to a better understanding of the basic principles and so to a greater success in making predictions and constructing models.

Content There are four main blocks:

Block A Ecosystems (Units 1-4) examines the role of primary producers, consumers and decomposers in ecosystems. This block concludes with the study of different examples of whole ecosystems.

Block B Distribution and interactions (Units 5-8) The distribution of individuals is discussed in the light of their tolerance of environmental factors; their environmental requisites; their means of dispersal; historical aspects; their interactions with members of the same species and with members of other species.

Block C Population ecology (Units 9-14) considers how sizes of populations can be measured or estimated and the processes which determine or regulate the sizes of plant and animal populations. A wide range of examples is discussed. This part of the course requires study of the set book, Begon and Mortimer *Population Ecology* (see below).

Block D Humans and ecology (Units 15 and 16) The conflicts of interest between conservation, food production and increase in human population are discussed in the light of ecological principles developed earlier in the course.

Practical fieldwork is carried out in two important parts of the course: a one-week residential school at a Field Studies Council Centre (see below), and individual projects. You are required to plan and carry out an ecological project in your home locality. Advice and support for this is provided by the Project Guide, which includes advice on the analysis of results and the use of statistics, and by close liaison with a course tutor. Two TMAs relate to the project.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S323] which it replaced.

Recommended prerequisites It is assumed that you have taken both S102 and [S202]/S203.

Complementary and related courses This course complements other third-level biology courses S324, S325 and [S364], and is related to S330 [S334].

Tuition Tuition will be mainly concerned with the development of individual projects; there will be no course-based tutorials.

Assessment (i) Four TMAs (two course-based and two project-based) (35%); (ii) four CMAs (15%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes Sixteen TV programmes (which should be seen in colour) and four audio cassettes.

Home kit A few items are available on loan to support your project work if necessary. There is not a home kit sent to all students.

Residential school One-week residential schools are held in April and May at six centres run by the Field Studies Council. This is an essential part of the course because basic training is given in planning and carrying out fieldwork, and in identification of organisms.

Set books M. Begon and M. Mortimer *Population Ecology* (2nd edition) Blackwell Scientific Publications. N. Chalmers and P. Parker *Fieldwork and Statistics for Ecological Projects* — the OU Project Guide, Field Studies Council, Occasional Publication No 9 (2nd edn.). (An order form for this book will be enclosed in the first mailing.)

S330

OCEANOGRAPHY

Third level: half credit

'Black smokers' on the East Pacific Rise and Mid-Atlantic Ridge pumping out plumes of sulphide particles at 350°C or more; the relationship between the greenhouse effect and rising sea-levels world-wide; great eddy systems in the ocean resembling atmospheric cyclones and anticyclones; subtle changes in sea-surface temperature distribution across the Pacific which not only bring disaster to Peruvian fishers (El Niño) but are also related to drought in the African Sahel; the

intermittent and sporadic pattern of sedimentation in the deep oceans; the global view of many ocean properties that satellite technology can provide — these are just some of the latest developments in the science of oceanography.

This is the most interdisciplinary course presented by the Earth sciences discipline. Oceanography is literally a 'whole Earth' science, for the oceans cover seventy per cent of our globe and interact continuously with the solid Earth beneath and the atmosphere above, while providing the setting for a large part of the planet's biological production. Physics, chemistry and biology are all prominent in the course because their relationship in the marine environment is the essence of oceanography.

The aims of the course are to provide a scientific basis for understanding:

- The oceanic environment.
- The interrelationships between the various disciplines within oceanography.
- The rates at which fundamental processes operate in the oceans.
- How the present-day oceans evolved.
- The technical problems of investigating the oceans.
- The effect of human beings on the oceans and the legal and environmental problems involved in managing the oceans responsibly.

Content The course consists of seven volumes, one of which is a set book on marine biology.

Ocean basins Nature and formation of ocean crust; effects of hydro-thermal circulation.

Seawater Composition, properties, history; transmission of light and sound.

Ocean circulation Surface and deep current systems; interaction between ocean and atmosphere.

Waves, tides and shallow water processes Propagation of wind driven and tidal wave motions; how waves and tides shape shelf and shoreline.

Introduction to marine ecology Marine biology from an ecological viewpoint.

Ocean chemistry and deep-sea sediments Chemical cycles and fluxes in the oceans; deposition and diagenesis of sediments in the deep oceans.

Case studies Selected topics illustrating the interdisciplinary aspects of oceanography and the legal and political aspects of ocean exploitation and management.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S334].

Recommended prerequisites Good passes in S102 and two second-level science courses, preferably in different disciplines. The basic principles of physical oceanography are the key to understanding many aspects of the science as a whole, but the 'physical' concepts involved in S330 are not much more complex than those to be found in the science foundation course, and probably simpler than anything encountered in second-level physics courses.

Complementary and related courses S330 is in the University's Environmental Science area. It is also part of the Science Faculty's 'major interest area' on astronomy and planetary science.

Assessment (i) Four equally weighted TMAs (35%); (ii) five equally weighted CMAs (15%) designed to test progressively your grasp of multidisciplinary relationships in oceanography; (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Tuition Tutorials will be supplemented by regionally organized day schools wherever possible.

Broadcasts and cassettes There is a fifty-minute introductory programme and eight standard TV programmes, three of which cover basic principles of oceanography; the rest are case studies illustrating interdisciplinary aspects of the science. Four and a half hours of audio cassette time are used mainly to help with the more difficult parts of the course.

Set books R. S. K. Barnes and R. N. Hughes (1988) *An Introduction to Marine Ecology*, Blackwell Scientific Publications (2nd edn.).

Students with disabilities The course contains relatively complex visual material which is difficult to transfer to alternative media. Course and supplementary materials are not available on tape.

S339

UNDERSTANDING THE CONTINENTS: TECTONIC AND THERMAL PROCESSES OF THE LITHOSPHERE

Third level: half credit

The general aim of S339 is to make you aware of:

- The role of the lithosphere in accounting for the behaviour and geological evolution of the continental crust.
- The use of the techniques of field geology, mineralogy, geochemistry and geophysics in evaluating the geological history of a segment of continental crust.
- How an integrated study of such data can be used to construct a picture of the geological evolution of a given area of continental crust.
- The role of mantle magmatism and crustal metamorphic and melting processes in continental growth and modification during crustal separation, collision and accretion.

Content

Block 1 reviews and revises plate tectonic processes and lithosphere evolution, and the geological history of Britain. The development of the lithosphere (on a global scale) and, more specifically, the British lithosphere is introduced through tectonic/geophysical case studies.

Block 2 examines extensional regimes and their associated magmatism, using the Red Sea and the East African Rift as modern examples and the Carboniferous Midland Valley of Scotland as an older example.

Block 3 looks at subduction zones, sites of intense tectonic and magmatic activity and associated mineralization. These are believed to be of great importance in the formation of continental crust. The Aegean island arc (Santorini) and the Andean plate margin are contrasted with the products of a similar setting during the Lower Palaeozoic of Wales and northern England.

Block 4 uses examples from the Alps and from the Moianian and Dalradian rocks of central Scotland to describe the principles involved in continental collision, which may terminate the plate tectonic processes of ocean formation and lithosphere subduction.

Block 5 investigates deep crustal processes and the tectonic and magmatic processes involved during the early history of the Earth.

Block 6 draws together the strands of earlier blocks, using the Himalayas as a case study of tectonic and magmatic processes at an active plate margin.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S333], [S336], [S337].

Recommended prerequisites S236 and S237.

Complementary and related courses S338, a half-credit third-level Earth science course with a 'soft rock' specialism, is presented in alternate years with S339.

Assessment (i) Four TMAs (30%), (ii) four CMAs (20%) and (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Cassettes There are no radio or television broadcasts, but returnable video cassettes are included in the home kit.

Home kit The home kit consists of a petrological microscope and a set of rocks and thin sections. It may not be taken or sent outside the United Kingdom.

Residential school The one-week summer school is course based and is held at the Kinross Field Centre near Pitlochry in Scotland. It provides field and laboratory work appropriate to the course. The accommodation is spartan and you may be expected to share a room.

Students with disabilities The residential school will be impossible if you have mobility difficulties, because of the fieldwork. If you have visual or manual handicap you may have substantial difficulty with the visual aspects of the course, particularly the use of maps and the microscope. Course and supplementary materials are not available on tape.

Set book You will have to buy a copy of the Geological Survey Map of Tay-Forth. More information about this will be sent in the first course mailing.

S342

PHYSICAL CHEMISTRY: PRINCIPLES OF CHEMICAL CHANGE

Third level: half credit

The course takes as its main theme an examination of the general chemical principles that govern whether, how, and in what conditions substances will react with one another. Broadly speaking, these principles are derived from two of the most important cornerstones of physical chemistry: thermodynamics and chemical kinetics. In this sense, the course complements other courses in the chemistry profile, and is essential for students mainly interested in chemistry or other aspects of molecular science.

A second important aim of the course is to stress the far-reaching practical importance of these same principles — not only in the chemical industry, but also in material science and in regulating the vital processes that underlie life itself. So the course will also make a useful contribution to degree programmes that are broadly based in science and technology.

Content The course comprises eight main blocks (of different length), together with three roughly unit-length Topic Studies. Each of these takes a real problem (one from the life sciences, one from the chemical industry, and one from material science) and examines it in the light of the chemical principles developed up to that point.

The 'core' areas of physical chemistry covered are:

- **Chemical thermodynamics**, which provides a set of precise criteria for predicting the equilibrium position for a given reaction.
- **Chemical kinetics**, which governs the rate of a chemical reaction and gives information about the reaction mechanism which, in turn, can be used to suggest means of providing a faster reaction pathway: *catalysis*.
- **Surface chemistry**, which examines the underlying reasons for the inherent catalytic activity of metal and metal oxide surfaces, *heterogeneous catalysis*, and also discusses spectroscopic and diffraction techniques for studying surfaces.

• **Electrochemistry**, in which both thermodynamic and kinetic principles can be applied to improve our understanding of electrochemical processes (such as the operation of batteries and the electrolytic extraction of metals).

Through the Topic Studies, the course stresses the practical importance of a knowledge of physical chemistry in areas as diverse as understanding the regulatory control of enzymes in the body; the potential for using coal as an alternative raw materials base for the chemical and fuel industries; and the prevention of metallic corrosion.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites S102 and S247. The subject matter of S342 requires a quantitative approach, and the course builds on the skills in logical argument and analysis developed in the prerequisite courses. The only mathematical skill assumed is elementary algebra, for which S102 provides an adequate background. Any further mathematical techniques required are developed in the course.

Assessment (i) Four TMAs (30%); (ii) four summative CMAs (20%) and one formative CMA (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes The first six blocks have a closely linked television component. Six of the seven programmes will be transmitted during the study of these blocks. You must watch these programmes, preferably in colour.

There are also audio cassettes providing structured exercises, TV back-up, and discussion and debate on Topic Study areas, so you must have the use of a cassette player.

Calculator You will need a basic scientific calculator with the functions: common and natural logarithms (and their inverses); powers and reciprocals of numbers.

Residential school A one-week course-based summer school consisting largely of experimental

work, but also including tutorials, computing work and a problem-solving session.

Students with disabilities If you have severe restrictions in mobility or manual dexterity or a severe visual handicap you will have difficulty with the residential school. Course and supplementary materials are not available on tape.

S343

INORGANIC CHEMISTRY

Third level: half credit

Over the last decade inorganic chemistry has undergone a revolution and is now the basis of many aspects of modern technological life. Solid state processors, high-temperature superconductivity, ceramics, enzyme action, chemotherapy and nuclear reactions can all come under the widening umbrella of inorganic chemistry. This course is designed to bring you to the forefront of the contemporary ideas and theories of the subject and to show how they provide the impetus for practical developments of the future.

Content The first half of the course is concerned with the theories that link the many facets of transition metal chemistry. After an introduction to the behaviour of the transition metals and their aqueous ions, the course moves to the application of molecular orbital theory. The disparate properties of magnetism, spectra and bonding are brought together with one powerful unifying theory. After a consideration of the thermodynamic aspects of transition metal compounds, their structure is investigated using nuclear magnetic resonance spectroscopy.

The rest of the course is divided into four sections, each examining a particular area where inorganic chemistry has a significant effect on modern society. Organometallic chemistry gives us the means to custom-build molecules to perform special roles, to design catalysts and to aid stereospecific synthesis. Progress in high-temperature superconductivity and its potential for revolutionizing the electronics and electrical industry is part of solid-state chemistry. Designer ceramics and zeolites are two other exciting areas.

It is now recognized that metals often play a crucial role at the active site of an enzyme. The operation of natural nitrogen-fixing systems gives an insight into the versatility of the co-ordinated metal environment. Completing the main text is a study of the chemistry of the transuranic elements and an assessment of how this knowledge can be applied to the problems associated with nuclear fuel manufacture and its reprocessing.

As well as the course texts there is a selection of original published papers.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S304], [S351], [S352].

Recommended prerequisites S102, S246 and S247. The course relies especially heavily on knowledge gained from S247.

Complementary and related courses S342, S344.

Assessment Four CMAs and four TMAs (50%); and the examination (50%). Substitution can apply to one CMA and one TMA.

Cassettes An interactive video programme gives you the means to acquire a critical approach to experiment design and assessment. The two returnable video cassettes also contain programmes which look at the application of inorganic chemistry to a range of commercially important areas, together with short sequences dealing with selected teaching points. You will need access to a VHS video player. Structured exercises are presented on a 90-minute audio cassette.

Home kit There are no home experiments for this course but a kit for the construction of molecular models is included.

Residential school A one-week discipline-based summer school (shared with S344), featuring advanced laboratory work, supported by evening tutorials and seminars.

Students with disabilities If you have severe restrictions in mobility or manual dexterity or a severe visual handicap you will have difficulty with the residential school. Course and supplementary materials are not available on tape.

S344

ORGANIC CHEMISTRY: A SYNTHESIS APPROACH

Third level: half credit

'Histamine discovery could help insomniacs'; 'Malaria vaccine may be close'; 'Sex lure keeps tabs on crop pests'. These headlines from recent newspaper and magazine articles draw attention to current progress in the development of new substances for use in health care and agriculture. It is one of the aims of S344 to explore, by means of a carefully graded series of four case studies, the many facets of the complex process involved in the discovery and use of such substances.

The course is designed to stimulate interest in and increase your knowledge and understanding of advanced organic chemistry, through the medium of organic synthesis. It introduces a wide range of modern organic reactions, with particular emphasis on those with a high degree of selectivity, illustrating their use for the synthesis of organic compounds of interest in chemical research and in industry.

The case study materials have the additional role of developing your skills as an independent learner and in problem-solving.

Content The course is split into eight core blocks plus the four case studies:

- Block 1 Fundamentals of organic synthesis
- Block 1.1 Strategy and selectivity
- Block 1.2 Electronic and steric effects
- Block 1.3 Elements of stereochemistry
- Block 2 Home experiment project
- Case study 1 Peptide synthesis
- Block 3 Spectroscopy and structure
- Block 3.1 Mass spectrometry
- Block 3.2 Infrared spectroscopy
- Block 3.3 Nuclear magnetic resonance spectroscopy
- Block 4 Functional group interconversion
- Block 5 Organoheteroatom reagents
- Case study 2 Pheromones
- Block 6 Enols, enolates and enamines 1
- Block 7 Enols, enolates and enamines 2
- Case study 3 Prostaglandins
- Block 8 Synthesis of cyclic compounds
- Case study 4 Beta-lactams

The course begins with revision and extension of the disconnection approach to organic synthesis strategy introduced in S246. Treatment of electronic theory and stereochemistry provides the basis for understanding a wide variety of different types of reactions and of organic reactivity in general; special attention is given to the use of selective reactions to achieve a particular molecular transformation. Modern chromatographic and spectroscopic techniques for the purification and identification of organic compounds are also introduced. The four case studies described above illustrate in depth the use of both the theoretical concepts and the experimental techniques in organic synthesis.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [S304], which this course replaces, [S351] and [S352].

Recommended prerequisites S102 and S246.

Assessment (i) Four TMAs (32%); (ii) four CMAs (18%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Cassettes You must have access to a VHS video cassette player, since about five hours of video material is provided as part of the course. The video sequences are a mixture of two types. There are some TV-style programmes, four of which are associated with the case studies; there are also video sequences of various lengths dealing with spectroscopic, chromatographic and other laboratory techniques. There are four one-hour audio cassettes for use in audio-visual sequences.

Home kit The experiment kit is in two parts. The first, and smaller, part contains a molecular model kit, a stereoviewer and the returnable video cassettes. The second part contains the necessary equipment and materials for use in a specially developed week-long 'mini-project' which is the only work for that week. This constitutes the only experimental work undertaken at home. This kit cannot be taken overseas.

Residential school A one-week discipline-based summer school, sharing with S343.

Students with disabilities Although the residential school includes a considerable amount of laboratory work and there is a fair number of audio-visual components, no students should be discouraged from taking S344. But if you have a severe visual handicap

or severe restrictions in mobility or manual dexterity you will find some course components very difficult. Course and supplementary materials are not available on tape.

Set book J. McMurry *Organic Chemistry*, Chapman and Hall (2nd edn.). You must buy the second edition.

S354

UNDERSTANDING SPACE AND TIME

Third level: half credit

The main part of the course explains the concepts of space and time as used in modern science. The emphasis is on how the ideas of space and time lead to physical theories, such as relativity, the success of which can be judged by means of experiments. The course ends by using the concepts developed in Units 1-12 to attack the questions of the origin of the Universe and its future evolution.

The nature of space and time is so fundamental that the course should be of interest in its own right, as well as to anyone who wants a firm basis for the exact sciences, especially modern physics.

Content The course is in six main sections which run parallel, broadly speaking, to the historical development.

Block 1 Newton was the first person to show how to make quantitative calculations on the dynamics of moving bodies. His mathematical methods are still of great practical use and some of his assumptions about space and time (such as the principle of relativity) continue to be of great importance today. But Newton's ideas about lengths and time intervals will need to be greatly revised later in the course.

Block 2 The first unit in this block surveys, with the help of experiments shown on television, the experimentally established laws of electricity, magnetism and light. The theory of electromagnetism leads us to see for the first time that the Newtonian world-view needs modifying. This fact was realized by Einstein who, in 1905, replaced Newtonian mechanics by his special theory of relativity. Block 2 describes this theory and shows that it leads to better agreement with experiments — dramatically better in the case of elementary particles and light. The basic idea is a simple one, that the observed laws should not be changed by uniform motion. That this is borne out by experiment implies a certain 'symmetry' of space and time.

Block 3 Having discussed some continuous symmetries of space and time, we now ask whether there are additional symmetries under reflection. Some experiments with nuclei and particles show a lack of symmetry under reflections in space — they distinguish between left and right. We are led to discuss the prediction and discovery of antimatter, and the perfect symmetry under the combined reflection of space, time and matter.

Block 4 This describes the remarkable changes which the advent of general relativity has made to our understanding of space and time. We try to give meaning to the words 'curved space-time' by discussing how general relativity describes space-time as curved in the presence of matter and predicts the motion of particles in a curved space-time. Because of the success of Einstein's predictions of physical phenomena such as light bending (which are not predictable within the Newtonian scheme), we are confident that the nature of space-time as described by general relativity is the most accurate and comprehensive picture of space-time that we currently possess.

Block 5 All these considerations of space and time are brought together in describing the expansion of the Universe. It probably started from a 'big bang' in which energy was interchanged between matter and radiation in a way explained by special relativity. Some of that radiation and matter has survived until the present day and still carries the imprint of the big bang. The large-scale dynamics of the Universe can now be understood through general relativity which, combined with astronomical measurements, leads to the tentative conclusion that the Universe is 'open' and will go on expanding for ever.

Block 6 The last section discusses three topics of a less analytical and more topical nature. Part A considers the radio background radiation which is believed to fill the Universe and gives us

evidence for the creation of the Universe in the 'big bang'. Part B turns to the predictions of general relativity in the most extreme conditions of matter collapsing to form black holes, and Part C discusses the intriguing question of why the laws of particle physics are almost unaffected by reflection of time. The direction of time is unmistakable: we remember the past and not the future. Could this asymmetry in time be related to another important asymmetry we know of — the expansion of the Universe?

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Knowledge of basic calculus and traditional algebra is essential. Some key mathematical ideas will be reviewed briefly within the course, but you should not attempt this course without a knowledge of calculus and algebra equivalent to that provided by [MST281] or [MS283]/[MST284] or [M100]/[M101]. The mathematics will often be used as an aid in expressing arguments in a concise form. On the whole, we do not expect you to perform difficult calculations for yourself, but without this level of mathematical knowledge you will find it impossible to get started on the course. Similarly, we expect familiarity with basic physical concepts, to the level developed in the science foundation course [S100] Units 1-7, 28-32, or [S101] Units 1-5, 8-11, 29-31, or S102 Units 1-4, 9-12, 30-32, together with an ability to use them in clear physical arguments.

Two other courses provide useful background material: MST204 will strengthen your mathematical skills, and S271 contains an elementary introduction to Newtonian mechanics and relativity. If you wish to study either of these courses, it would be advisable to do so before starting S354, but they are not essential prerequisites.

Assessment (i) Four TMAs (20%); (ii) six CMAs (30%); (iii) examination (50%). Substitution can apply to one TMA and two CMAs.

Broadcasts and cassettes Seventeen television programmes, made in collaboration with the University of California; eight former radio programmes on audio cassettes. The television programmes are, broadly speaking, more concerned with experimental aspects of space and time and we consider them essential to a balanced view of the subject. The cassettes are about the more speculative and philosophical aspects.

There are a further six cassette tapes, one for each block of the course.

Preparatory reading There is no set book, but R. Feynman *The Character of Physical Law*, MIT Press, discusses many of these topics in an informal way, and is strongly recommended as an introduction to, and in conjunction with, the course. Another book which we can strongly recommend is J. Schwinger *Einstein's Legacy — the Unity of Space and Time*, Scientific American.

S365

EVOLUTION

Third level: half credit

This interdisciplinary course is written by both the Biology and the Earth Sciences Departments. It gives a good general introduction to both the biological and the paleontological aspects of evolution, and so will be particularly rewarding to students who have an interest in biology or the Earth sciences.

Many of the aims of this course are similar to those of its popular predecessor, [S364], but the contents have been reorganized and brought up to date. In particular, the course demonstrates how small genetic changes within populations (microevolution) can occur; how they can lead to genetic differences between populations; how new species can arise; how variation in the rates of speciation and of extinction can lead to large-scale evolutionary patterns (macroevolution); and how all these help to explain particular episodes of evolutionary history and also to predict certain aspects of future evolution.

The course will also give you some of the skills appropriate to intending students of evolution, such as expressing models of evolutionary change in qualitative and mathematical form and testing these models with observed data; planning and carrying out practical investigations into the evolution of living and fossil organisms and analysing the significance of the results; and synthesizing and writing up the results of practical studies and studies of the literature of evolutionary phenomena, integrating biological and geological information as appropriate.

Content

Introduction ($\frac{1}{2}$ unit equivalent) is a brief introduction to the subject and the course.

Part I Microevolution ($\frac{1}{2}$ unit equivalent) demonstrates the variation present in natural populations and investigates how genetic changes within such populations can occur.

Some of the material here will provide the basis for a project.

Part II The origin of species ($\frac{1}{2}$ unit equivalent) looks at biological models of speciation and how these compare with the fossil record of species and speciation. The home kit will include an exercise using fossil replicas.

Part III Macroevolution ($\frac{1}{2}$ unit equivalent) examines the data that can be derived from the fossil record, the patterns these data produce, and how these patterns have been influenced by the changing geography of the Earth and also by differential rates of speciation and extinction.

Part IV Case studies (3 unit equivalent) asks how material in the earlier parts of the course can help to explain the origin of life systems, the invasion of the land, human evolution and evolution in the future.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [S364].

Recommended prerequisites S102. You are also strongly advised to have taken at least S203/[S202] or S236, since S365 is considerably more advanced than S102.

Complementary and related courses S203/[S202] S236 and most third-level biology and Earth science courses, in particular S298, S326 and S338.

Assessment Four TMAs (one based on a project), four CMAs and the examination.

Cassettes Ten programmes on video cassettes and three programmes on audio cassettes.

Home kit This will include a set of plaster fossil casts, a palaeontological data book, video cassettes and grass seed for a project option.

Computing There will be a computer project option for which you will need regular use of a computer that meets the specification of the University's home computing policy (see page 4).

Students with disabilities Difficulties are foreseen if you have a visual handicap or impaired manual dexterity, though it is possible that these could be overcome with help. Course and supplementary material will be available on tape in 1993.

Special features You will need the use of a video cassette player.

S442

DIRECTED STUDIES COURSE IN CHEMISTRY: NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY IN CHEMISTRY AND THE LIFE SCIENCES

Fourth level: half credit

This is the second project-based course to be offered by the Chemistry Department and will appeal to students who have a keen interest in chemistry. It is intended for those who have almost completed their honours degree, giving an opportunity to undertake an independent piece of work similar to the directed project work carried out by final-year honours students at other institutions.

The aims of the course are divided between gaining a working knowledge of the principles and applications of modern nuclear magnetic resonance (nmr) spectroscopy and acquiring the skills of abstracting, assessing and producing a coherent piece of scientific writing within a selected study topic.

Content The subject material is based upon the versatile technique of nmr spectroscopy and covers its many applications in both chemistry and the life sciences. The approach is multinuclear and encompasses topics such as chemical shielding, modern pulse techniques including two-dimensional nmr, nmr of solids, ^{31}P nmr in biochemistry and aspects of nmr imaging.

The teaching material, equivalent to four units, is based on a set book supported by two blocks of text and three audio cassettes. The rest of the course is self-directed and requires the preparation of a literature project in a selected topic area. Topics will vary from the purely chemical to those leading into the life sciences. A week-end school will reinforce the teaching

material and provide instruction in library methods appropriate to the project areas available for further study, giving you an opportunity to finalize your individual study project. After the school you will be expected to use local scientific libraries to acquire the information relevant to your project area and to write up your project work as a 5,000-8,000 word report including literature references.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites A full credit in chemistry at third level, passed at grade three or higher. This should preferably include S343 or S344. Only about twenty-five students can be accepted each year.

Assessment (i) Two TMAs; (ii) the literature project; (iii) examination. No substitution will be allowed.

Residential school The week-end school is an essential part of the course. It will be held at Walton Hall in early April.

Students with disabilities The nature of the course may make it difficult if you have impaired sight or mobility. Course and supplementary materials are not available on tape.

Set book Details of the set book will be sent to you in your first course mailing.

Special features Because the main element of this course is the self-directed literature project, you must have access to a scientific library that has chemistry and life sciences abstracting services and journals.

SD206

BIOLOGY: BRAIN AND BEHAVIOUR

Second level: full credit

Like its predecessor [SD286], SD206 will appeal to students from many backgrounds. It will interest students of biology who want to extend their knowledge of neurobiology and the problems of explaining animal behaviour. It will also be of great value to psychology students who need an introduction to the brain and its role in controlling behaviour. There is an emphasis throughout the course on health, which should make it attractive to nurses, social workers and those in paramedical fields who are interested in behaviour in a biological or medical context. The course is designed so that students with no biological or scientific background will be able to follow it. Anyone whose interest is primarily scientific should not be discouraged, however, as every attempt will be made to reconcile this potential conflict of interests.

The main aims of the courses are:

- To present an integrated, interdisciplinary approach to the brain and behavioural sciences and the relationships between them.
- To provide a core of basic knowledge about animal behaviour and neurobiology which will enable you to go on to a detailed interdisciplinary study of important topics in the field.
- To compare the behaviour and nervous systems of human beings and other animals and, at the same time, examine the unique attributes associated with a complex nervous system.
- To emphasize the importance of observational and experimental methods in the brain and behavioural sciences and to introduce experimental design and analysis.
- To consider the implications for human health of the knowledge we have of behaviour and the nervous system, and to show how the study of disease has helped in the study of normal physiology.
- To emphasize the conceptual, historical and social context of the study of the brain and behavioural sciences.

Content The course is divided into seven books of varying lengths. The first two provide basic information about behavioural and brain sciences respectively. They are followed by a series of 'topics', each explored in an interdisciplinary way, bringing together knowledge from animal behaviour, psychology and neurobiology. There is also a book about the history of the brain and behavioural sciences, for use in parallel with the main text.

Book 1 Behaviour and evolution An introduction to animal behaviour and evolution, looking at adaptation and diversity among living organisms; the genetic basis of behaviour; the causes of behaviour (stimuli, sense organs and motivation); the development of behaviour

(altruistic and precocial periods, imprinting, nurture); the function of empirical approaches; experiments, and the benefits of phylogenetic experiments and behaviour and psychology.

Book 2 Neurophysiology The nervous system, regulation and control, the gross anatomy and function of the transmitting signals; senses; the control muscles of the body.

Book 3 Senses gates the senses hearing and smell communication.

Book 4 Development development and system and in behaviour memory.

Book 5 Control motivation sleep aggression.

Book 6 Consider appear to be immunology; brain ageing. The last part can explain and predict.

Book 7 discusses behavioural science.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination which this course replaces.

Recommended prerequisites

Complementary S324, [S364], D307, U205.

Assessment (i) Eight (10%); and (ii) the examination worth 7.5%; one is worth 2.5%. Students should have a video cassette player.

Broadcasts and cassettes related to the course programmes. There is video material and audio cassettes throughout the course.

Home kit You will need using simple equipment that you can readily obtain. The video cassette contains the video cassette of a human brain, which shows the internal structure.

Residential school summer school with The experimental work neurophysiology; (2) animal behaviour. In properties of the nervous system in humans; in Block 2, effective experiment to how to analyse the results you will investigate, for (rats, woodlice and behaviour and why it is and reproduce.

Students with disabilities vision or limited manual practical work for the residential school. The school of 'monitor' cause problems if you supplementary material 1993.

Special features You cassette player so that material, part of which analysis of animal behaviour, though not necessary.

SM355

QUANTUM PHYSICS

Third level: half credit

This course gives a principles, methods and quantum theory, and

(altricial and precocial life histories, sensitive periods, imprinting, bird song, nature versus nurture); the functions of behaviour (the empirical approach, hypothesis testing, experiments, alternative strategies, costs and benefits of behaviours); evolution and phylogenetic constraints; laboratory experiments and links between animal behaviour and psychology.

Book 2 Neurophysiology An introduction to neurophysiology, examining the links between the nervous system and hormones; the regulation and control of the nervous system; the gross anatomy of the brain; the fine structure and function of the nerve cell; generating and transmitting signals in the nervous system; the senses; the control by the nervous system of the muscles of the body.

Book 3 Senses and communication Investigates the senses — vision, touch and pain, hearing and smell and their role in language and communication.

Book 4 Development and flexibility looks at development and flexibility in the nervous system and in behaviour, and at learning and memory.

Book 5 Control of behaviour examines motivation sleep and biological clocks and aggression.

Book 6 considers what happens when things appear to be 'going wrong': stress and immunology; brain damage and disease; ageing. The last part of the course asks how we can explain and perhaps change behaviour.

Book 7 discusses the history of the brain and behavioural sciences.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [SDT286] and [SD286], which this course replaces.

Recommended prerequisites S102 or D102.

Complementary and related courses [S202], [S324], [S364], D307, D309, DSE202, E206, E362, U205.

Assessment (i) Eight TMAs (40%); (ii) four CMA (10%); and (iii) the examination (50%). One TMA is a project worth 7.5%; six TMAs are worth 5% each and one is worth 2.5%. Substitution can apply to one TMA and one CMA but not to the project.

Broadcasts and cassettes Eight TV programmes related to the course, and two 'magazine'-type radio programmes. There will also be about three hours of video material and about ten audio tutorials spread throughout the course.

Home kit You will carry out two home experiments using simple equipment, such as a ruler or dividers, that you can readily obtain for yourself. The home kit contains the video cassettes and a life-sized model of a human half-brain, which can be dismantled to show the internal structure.

Residential school A one-week course-based summer school with experimental work and tutorials. The experimental work is divided into three blocks: (1) neurophysiology; (2) experimental design; and (3) animal behaviour. In Block 1 you will look at some properties of the nervous control of muscle contraction in humans; in Block 2, you will learn how to design an effective experiment to test a particular hypothesis and how to analyse the results you obtain; and in Block 3, you will investigate, for three different species of animal (rats, woodlice and chicks), what causes their behaviour and why it is necessary if they are to survive and reproduce.

Students with disabilities If you have impaired vision or limited manual dexterity you may find practical work for the home experiments and at residential school difficult. The extensive use at the school of 'monitor screens to display data etc. may cause problems if you have epilepsy. Course and supplementary material will be available on tape in 1993.

Special features You should have access to a video-cassette player so that you can watch the video material, part of which will be an exercise in the analysis of animal behaviour. A calculator will be useful, though not necessary, at the residential school.

SM355

QUANTUM MECHANICS

Third level: half credit

This course gives a thorough grounding in the principles, methods, and philosophy of quantum theory, and shows how the theory can

lead to quantitative results particularly in the field of atomic structure.

Content

Units 1 and 2 The relevant physical principles and mathematical techniques taught in the recommended prerequisite courses (S271 and MST204) are reviewed and developed.

Units 3-8 The mathematical properties of the Schrodinger wave equation are investigated, its physical interpretation established and applied to simple physical systems (potential wells and barriers) including a study of the quantized vibrational states of diatomic molecules. These simple applications illustrate the mathematical techniques and reveal many of the surprising and essentially quantum aspects of matter, such as the existence of discrete energy levels in atoms and nuclei, and the tunnelling of atomic particles through potential barriers. The extension to two- and three-dimensional systems leads to the quantization of angular momentum, the introduction of electron spin and the concept of energy degeneracy.

Units 9-11 We look more deeply into the mathematical structure of quantum theory, and the relationship between this structure and the actual observations and measurements that are made in the laboratory when the theory's predictions are tested. In doing this the postulatory basis is clarified and some of the philosophical and interpretive difficulties of the theory which still inspire debate are exposed.

Units 12-16 We return to the study of atomic and molecular systems using the Schrodinger theory, with the additional mathematical insights, techniques and notation gained from Units 9-11. Studying the behaviour of an atomic system in three dimensions leads to a further development of quantized angular momentum theory with applications to the quantized rotational states of diatomic molecules, and the orbital angular momentum states of the single electron in the hydrogen atom. The theory of the energy levels of the hydrogen atom is worked out in considerable detail. In Unit 14 two approximation techniques are introduced, perturbation theory and the variational method; in Unit 15 a study of systems containing two or more identical particles leads to the Pauli exclusion principle. These two developments allow us to investigate the main structural features of the helium atom and other multi-electron atoms. Finally these techniques are used to study the mechanism of chemical bonding between atoms as exemplified by the formation of the hydrogen molecule H_2 .

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [SM351].

Recommended prerequisites S271 and MST204. You must be well prepared for this course in your knowledge of basic physics and mathematics, although no knowledge of quantum mechanics is required. The basic prerequisite physics material should include Newtonian mechanics, electricity and magnetism, and the wave nature of light. In mathematics, fluency is required in the techniques of differentiation (including partial differentiation), integration and algebraic manipulations. It is also necessary to be familiar with vectors, complex numbers, and ordinary linear second order differential equations. You are strongly advised not to attempt this course unless you have obtained good passes in both the prerequisite courses.

A self-assessed diagnostic quiz will be available in the preceding year. This will give you some idea of the sort of knowledge required before you take SM355, and will enable you to judge the extent to which you can meet these requirements. You will then have an opportunity to do some preparatory work before the course begins. If you wish to receive the quiz, please send a large SAE (at least 30cm x 21cm) to: SM355 Course Manager, Physics Department, The Open University, Milton Keynes MK7 6AA.

Complementary and related courses S271 gives a survey of the whole of physics and is an ideal precursor to SM355, containing three units introducing the physics of quantum theory. Other physics courses of interest are S272 and S256. At third level, a balanced view of physics can only be obtained by studying S354 and SMT356 as well as SM355. Quantum theory represents one of the twentieth-century revolutions in our understanding of the universe. The other revolution, a new understanding of space and time based on relativity, is covered by S354. But classical physics, as dealt with in SMT356, still has a crucial part to play.

Assessment (i) Four TMAs (30%); (ii) six CMAs (20%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA but not CMA 46.

Cassettes There are two video and four audio cassettes.

Residential school A one-week course-based summer school.

Students with disabilities There should be no serious problems, although if you have manipulative difficulties you will not obtain full benefit from the residential school experiments. Course and supplementary materials are not available on tape.

Preparatory reading As preparatory reading, you might like to look at: [S101], Units 9, 10, 11, 29 and 30; or S102, Units 4, 9-12, 30-32; or S271, Units 13, 14 and 15. You might also like to establish a good start by taking a preliminary look at the set book on which the course is built.

Set book A. P. French and E. F. Taylor *An Introduction to Quantum Physics*, Van Nostrand Reinhold (UK). This book is used as the course text for eight of the sixteen units, that is, eight course units are centred on prescribed readings from the book. You will study about 70% of the book, and 95% of the book is relevant to the course. You must, therefore, obtain a copy of it if you intend to take this course.

SMT356

ELECTROMAGNETISM

Third level: half credit

The course gives a basic introduction to electromagnetism, leading up to Maxwell's equations and then applying these to such topics as electromagnetic radiation, microwaves and applications, reflection and polarization of light, antennae and the generation of electromagnetic radiation. The two basic ingredients for understanding much about the physical world are electromagnetism and quantum theory; this is the course where you can learn about the first of these. The technological importance of electromagnetism is obvious, and the course will balance this technological significance of electromagnetism, which is the natural force that we seem to understand most thoroughly.

Content The course closely follows the book *Electromagnetism* by Grant and Phillips, the second edition of which coincides with the first presentation of the course. The contents are: Mathematics revision.

Electrostatic fields, in free space and in media. Magnetic fields, forces on moving charges, generation of magnetic fields.

Magnetic fields in matter, magnets.

Magnetic induction, generation of electric currents by changing magnetic fields.

AC currents and circuits, resonance.

Maxwell's equations, and electromagnetic waves (light, radio, microwaves).

Interaction of EM waves and matter, e.g. reflection, absorption and refraction of light.

Microwaves, waveguides.

Generation of EM waves, antennae.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [SM352].

Recommended prerequisites MST204 and S271. The course has been written on the assumption that you are familiar with vectors, vector calculus and mechanics to the level of MST204, and you are advised not to attempt SMT356 without at least a Grade 3 pass in MST204 or the equivalent. In addition, basic physics at S271 level or equivalent is strongly recommended.

Complementary and related courses MST322, S354, SM355, T253, [T283], T292, T393.

Assessment (i) Four TMAs (25%); (ii) five CMAs (25%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA. There will also be one formative CMA.

Cassettes Three video cassettes. The Academic Computing Service will contribute to the videos, providing simulations of spatially complex and time-dependent physical situations.

Calculator You will need a calculator.

Set book You must buy the second edition of I. S. Grant and W. R. Phillips *Electromagnetism*, John Wiley. The course is based on readings from this book.

Preparatory reading You will benefit from a review of units to do with vectors and vector calculus from MST204. A more detailed reading list can be obtained from The Course Manager, SMT356, Physics Department, The Open University, Milton Keynes MK7 6AA.

ST291

IMAGES AND INFORMATION

Second level: half credit

This course is about modern imaging systems. It contains many exciting features, but it is not an easy course, so please read this description very carefully.

Modern imaging science embraces a vast array of techniques and devices (devices such as microscopes, telescopes, cameras, television sets) by means of which we can obtain and process information about the size and shape of objects that range from galaxies through bacteria to single atoms. Some devices work with light, others with radio waves, X-rays, electrons, acoustic waves, or even just numbers in a computer. After studying this course you should be able to:

- Describe and exemplify the ways in which man-made imaging systems increase our knowledge of the world around us.
- Give an account of the principles underlying the design of imaging systems.
- Specify in general terms the best sort of imaging system to obtain the desired information from an object of interest.
- Use to better advantage various imaging systems, ranging from the everyday camera to the more sophisticated imaging devices found in laboratory, hospital and factory.

Content ST291 is being gradually revised over the next five years. The first phase of the revision (Units 1-5) will be complete in 1992; the second phase is planned for 1994, and the third for 1995. The content, aims and objectives of the course remain essentially unchanged though naturally we have taken the opportunity to improve the teaching of parts of the course that students have found difficult — in particular, the first five units.

The course divides into a 'stem' of ten units and a 'tail' of six case studies. Though practical applications do occur in the stem, it is mainly concerned with the theoretical basis of modern imaging science. Modern analysis of imaging systems is based on the so-called Fourier approach. This is conceptually tricky, but in practical terms very rewarding. To gauge whether you are likely to be able to cope, pay careful attention to the advice given below under *Recommended Prerequisites*.

Topics covered in the 'stem' are:

- The 'waves and rays' approach to imaging.
- The Fourier explanation of diffraction.
- Coherent and incoherent illumination.
- Holographic recording of images.
- Lenses, images and transfer functions.
- Spatial filtering of images.

The case studies range from astronomical topics (the physics of the 'Crab Nebula', and the Mariner 9 space probe), through electron-microscopy, to two examples of medical imaging (ultrasound imaging techniques and computerized tomography).

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Read all of this very carefully.

You should have passed either S102 or T102, and you will need to have found (or now find) most of the units with a physical science basis in these courses fairly straightforward.

ST291 requires facility with basic mathematics, particularly sines, cosines, logarithms and simple algebra. A facility with graphs is also particularly important, because we have replaced the calculus and much of the algebra associated with this subject by a simpler graphical approach. Calculus is not used. But we know from students' performance and comments that the removal of calculus from a mathematical subject does not necessarily make that subject easy. The basic ideas in ST291 are essentially mathematical, and those who find mathematics unpalatable may well find ST291 hard going.

We have looked at the types of course previously taken at the Open University by students who pass ST291, and it seems to us that your chance of success improves if you do not take ST291 in your first year after foundation level. It does not seem to matter very much which higher-level courses you take before ST291, as long as the course code begins with M, S or T (though S271 is particularly appropriate).

Complementary and related courses S256, S271, T292, [T326].

Tuition and Academic Computing Service There are two sorts of ST291 tutorial — conventional tutorials and an optional computerized tutorial system called MERLIN (not an acronym, but the Celtic wizard). The conventional tutorials are concentrated towards the

beginning of the course, since this is where such support is most necessary. The computer tutorials cover Units 1-10 and are sent to you on floppy disks. They can be used on any computer that meets the specification of the University's home computing policy, though this course is not within the policy.

Assessment (i) Four TMAs (30%); five CMAs (20%); (iii) the examination (50%). Substitution

can apply to one TMA and one CMA.

Broadcasts and cassettes There are seventeen TV programmes, the first five of which will be sent to you on video cassette. The programmes are extremely important in providing visual support to many of the concepts in the main texts. You are likely to be at a disadvantage if you are not able to watch them. You will also receive four audio cassettes.

Home kit This includes a laser, a camera and an optical bench with fittings. Ample instructions are provided and ample time is allowed to use it. Though ST291 requires no special experimental skills, the home experiments are an essential part of the course. The kit may not be taken or sent outside the United Kingdom.

Students with disabilities If you have a visual

handicap you may find this course unsuitable, and there will be difficulties if you have impaired manual dexterity unless a helper is available to assist with practical work.

Set books G. Harburn, C. A. Taylor and T. R. Welberry *Atlas of Optical Transforms*. This is now a supplementary item and will be sent with your course material.

OVERVIEW

The pace of technological change is increasing and the implications and applications of technology are becoming more widespread and of concern to all members of society. Therefore this faculty is firmly committed to providing courses which enable you to:

- Understand current technological developments and their underlying assumptions, their implications and the surrounding issues.
- Develop and practise your skills in particular aspects of technology, its design and management.

We see this as a contribution to increasing understanding of today's world as well as tackling the problem of the serious shortages of technologists in various fields.

For those of you who have a clear view of your degree aspirations in technology or engineering, Table II will provide guidance. For others, this overview should prove useful in explaining how technology courses can make a valuable contribution to your degree profile.

An important part of planning your profile will be to consider, at an early stage, your long-term aims and their implications for your choice of courses. Your decision whether to study one or two foundation courses, for example, will need to be taken in the light of the recommended prerequisites of the higher-level courses you intend to take. Similarly, if you hope eventually to apply for membership of a professional body, you will need to plan accordingly: the requirements of the professional engineering institutions are summarized (and kept up to date) in Recognition Information Leaflet 3.3 obtainable from either the Central or your local Enquiry Service. Because of the Faculty's dual aim of breadth and depth and the correspondingly wide variety of courses offered, it is impossible to give any hard and fast rules about choosing your profile. The best advice is to think ahead, and make sure you read the course descriptions carefully.

The foundation course, *Living with technology*, exemplifies the Faculty's aim of combining breadth and depth. It sets some of the many technological developments in the context of people's everyday lives and discusses both the problems and the benefits they bring. It introduces a number of technical subjects and the use of a microcomputer and is also designed to help you develop your study skills along with literacy and numeracy skills. The course is included in the University's home computing policy. The choice of topics is deliberately broad and is concentrated around basic human needs of shelter, work, energy, material resources, food and health. The Faculty's higher-level courses continue to teach their particular topics in the context of real practical problems encountered in industry or elsewhere. In this way they each provide a self-contained study as well as a stepping-stone to other courses.

Whether you study a range of courses across the Faculty's offerings or split your studies more evenly between this faculty's courses and disciplines in other faculties, we would emphasize the need to balance depth and breadth. In order to meet this important requirement, we present two types of courses: those which are designed for students who want to know enough about technology to understand its effects and some of the principles it depends on, but do not wish to develop sufficient skills to practise in the field; and those which are designed for students who want to acquire professional skills and understanding in selected areas of technology. We do not claim that all our courses provide breadth and depth in equal measure, so you should read the course descriptions carefully, with particular attention to the recommended prerequisites.

At second level there are, to begin with, two introductory courses: TM282 *Modelling with mathematics: an introduction* (which can be taken at the same time as T102 *Living with technology*) and T281 *Basic physical science for technology*. These are half-credit courses which prepare those of you who have not taken the corresponding foundation courses for the more scientific and mathematical courses in technology. They can be taken at the same time, but if taken separately, T281 should follow TM282.

The subsequent courses that lead to a degree have been grouped roughly according to the Faculty's disciplines; however, you should consider the whole of the Faculty's offering, the sample degree profiles and the course descriptions before choosing courses.

Design courses are concerned with the underlying processes common to decision-making in technology. At second level T264 *Design principles and practice* leads on to T362 *Design and innovation*, T363 *Computer-aided design* and the inter-faculty course TM361 *Graphs, networks and design*.

In electronics and communications the second-level courses are T202 *Analogue and digital electronics*, T223 *Microprocessor-based computers* and T292 *Instrumentation*. An appropriate selection from these courses prepares you for T322 *Digital telecommunications*, T394 *Control engineering* and T393 *Electronic materials and devices*.

In engineering mechanics the second-level courses T234 *Environmental control and public health*, T235 *Engineering mechanics: solids and fluids*, T236 *Introduction to thermofluid mechanics*, as well as the interdisciplinary course T292 *Instrumentation*, lead on to the third-level interdisciplinary course T394 *Control engineering* (which is shared with electronics) and T331 *Engineering mechanics: solids and fluids*, T333 *Heat transfer: principles and applications* and T334 *Environmental monitoring and control*.

In the subject of materials, T201 *Materials in action* gives a broad introduction and there are also three half-credit courses derived from this course: T253 *Materials for electronics*, T254 *Stress on materials* and T255 *Materials in manufacturing*. These lead to the third-level courses T353 *Failure of stressed materials* and T393 *Electronic materials and devices*.

The systems discipline offers three second-level half-credit courses. T247 *Working with systems* provides a starting point if you are interested in tackling complexity and the general applicability of systems ideas. T244 *Managing in organizations* covers human and organizational issues, business and management. T274 *Food production systems* is a global case study of the many systems involved in access to adequate food. These three are not excluded combinations, and your choice and sequence depend on your interests. Any (or all) of these courses can lead to the third-level full-credit course T301 *Complexity, management and change: applying a systems approach*.

DT200 *An introduction to information technology* presents a survey of the technical and social aspects of microcomputers and their effect on society. (See Social Sciences Overview.)

The Faculty's profile of courses culminates in the fourth-level T401 *Technology project*, which will enable you to bring what you have learnt to bear on a substantial practical task. This is an essential course if you want professional recognition.

Finally, do remember that although this overview has been arranged according to disciplines, coherent degree profiles can be constructed across disciplines. In particular, systems and design courses are applicable to all other fields of technology.

When reading the following course descriptions do not forget to refer back to Sections 1–3 and Tables I, II and III at the beginning of this publication.

Under 'Notes for prospective students' discontinued courses are identified by square brackets; their titles and dates of presentation are listed in Table III.

T102

LIVING WITH TECHNOLOGY

Foundation level: full credit

Whether we like it or not, technology is an important part of our everyday lives. The title of T102, *Living with technology*, reflects the double-edged nature of our relationship with this technology. We need food, electricity, roads, telephones, etc. but we also see the problems they pose — the 'energy crisis', pollution and the conflict between automation and jobs. If you would like to know more about technology, what it involves, its methods, benefits and its problems, then T102 is the course for you. It will give you the skills to make your own judgements

about how we provide the necessities and luxuries of modern life.

The course teaches you some of the skills used by practising 'technologists' — the use of models, a systems approach, design and decision-making — along with some basic scientific and engineering principles in mechanics, energy conversion, computing and communications, materials and applied biology. It also introduces the industry-standard personal computer as a working tool. You will learn to use this tool as a word-processor, as a spreadsheet calculator, to produce graphics and as a database, but you won't have to learn programming. Most important of all for a foundation course, T102 will help you develop basic mathematical skills which will be invaluable throughout your university career and beyond.

T102 looks at our dependence on a complex infrastructure of technological activities associated with shelter, work, energy, materials, food and health. It considers current debates about the appropriate way of providing for these needs. We want to make the best use of the resources of energy, land, materials and human ability available to us, according to the social, political and economic systems we live in and the values we hold. These are all complex problems and at the end of the course you will be able to make an informed contribution to these debates and better understand this complexity.

You need no previous scientific or technical knowledge, but you are expected to be able to add, subtract, multiply and divide ordinary numbers. You will also be expected to be able to read text similar in style and complexity to articles such as you might find in serious newspapers and journals. You will learn about reading critically and interpreting technical arguments. Any extra mathematics you may need (such as decimals, simple algebra, reading and drawing graphs) is taught in special texts and in computer-assisted learning (CAL) packages. Remember that if these topics are completely new to you, you are bound to take longer to work through the material than someone who already has these mathematical skills.

You will need the use of a computer that meets the University's home computing policy specification. You will be taught how to use it with appropriate software, supplied as part of the course material.

Content The course is presented in seven blocks, each taking four to five weeks and each centred around an 'issue' of current concern. The issue of each block is developed in a 'mainstream' text designed to give a general view of the issue and the features which affect it. The knowledge and skills you need to understand and analyse the issue are covered in 'tributary' texts (and CAL material). These can be studied as suggested in the mainstream text or according to your own needs and preferences.

Block 1, *Home* is concerned with assessing the effectiveness of your own home. To help with this there are tributaries on heat and structures. The computing tributary introduces some basic facilities of the computer and of the main software package that you will be using throughout the course. The block culminates in a design task in which you plan a small house to meet a specification, using a computer-based spreadsheet for the necessary calculations.

Block 2 is about *Work* and the influence of 'new technology' on it. It considers how different kinds of work in retailing and distribution are being affected by microelectronics. There is a tributary on information technology. The computing tributary shows how to use your computer to organize note-taking and plan a report.

The issue in Block 3 *Energy* is 'Are district heating systems a good idea?' There are tributaries on energy conversion and electricity. The computing tributary develops the use of spreadsheets introduced in Block 1.

In the fourth block *Resources*, the issue is 'Are resources running out, and if so what can be done about it?' There are tributaries on chemistry and materials, and a computing tributary on databases, with the development of a T102 course index as an example of their use.

The fifth block, *Food*, asks 'Can current UK agricultural practices be sustained for at least the next thirty years?' There is a tributary on biology and a computing tributary on the use of graphics software, taking data from the agricultural census as its examples.

Health, the sixth block, asks 'Is the technology of modern living in the UK damaging to our health, and how can we decide what is the right technology to give us an appropriately healthy lifestyle?' It looks at ways of assessing health and methods for choosing between technologies in the light of their effects on health. There are tributaries on the biology of health, on summarizing and interpreting data and on printing integrated documents.

The last block does not introduce any new concepts or knowledge. You are asked to use what you have learnt from the course as a whole to present a report on a given topic. This report forms part of the examination.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T100], [T101], ET217.

Note ET217 is available only in the associate programme.

Assessment Six TMAs (30%) and six CMAs (15%), one of each associated with each of the first six blocks; an end-of-course report (10%) associated with the last block, and the examination (45%). Substitution can apply to one TMA and one CMA. There is also one formative (teaching) CMA which does not count towards your assessment score.

Broadcasts and cassettes Sixteen TV and eight radio broadcasts. Audio cassettes are used extensively: for further discussions about the TV programmes; in audio-vision, e.g. to talk you through a set of calculations; and in association with the computing tributaries.

Residential school A one-week course-based summer school offering practical work including laboratory and field work, tutorials on all aspects of the course, lectures and discussions.

Computing You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4).

Students with disabilities You are advised to discuss your special requirements with the technology staff tutor in the Welsh Regional Centre, Dr A. Armstrong, or the Office for Students with Disabilities. If you use a microcomputer fitted with aids and adaptations such as synthetic speech output or large-character display, you may have difficulty in accessing the computer-assisted learning packages; please discuss your special requirements as early as possible.

Preparatory work A preparatory package will be sent to you before the course begins.

T201

MATERIALS IN ACTION and also T253, T254, T255

Second level: full credit

These four materials courses are all excluded combinations: you will be able to take only one of them. You will need to consider your choice very seriously before you make your decision.

This set of courses has been designed to meet the needs of different groups of students. It offers either a broad full-credit course (T201) or, for those who are pursuing a more specialized degree profile, a choice from three half-credit courses (T253, T254, T255). The structure of and relationship between the full and half-credit courses is explained more fully below.

There are very few things we can do without using materials. Whether sitting and drinking, or flying or computing, we rely on a myriad of products to support our activities. Each product is made from materials chosen specially for the task, won from the Earth and fashioned into the required shapes.

Choosing materials for a product depends on a mixture of technical and commercial considerations but, above all, to perform satisfactorily 'in service' the materials must have the required characteristics (properties): sufficient strength, electrical conductivity, transparency, resistance to corrosion. Of course, failures do occur, from the mundane breaking of a plastic fork or a rusting car to dramatic disasters with an oil rig or space shuttle. Such failures usually happen because, for one reason or another, the wrong material was used or the

properties of the material were not properly understood.

Ultimately, the properties of the material are determined by its constitution and internal structure — the types of atom or molecule it contains, the bonding between them and how they are arranged in relation to one another and so on. In turn, the structure of a material is strongly influenced by its processing history; whether, for example, it has been cast from a liquid, pressed from a powder, moulded under pressure, or heat-treated. Over the last fifty years especially, scientific understanding of these structure/property relationships and how processing influences and controls them has made enormous progress and now provides a firm basis for making wise choices of materials and production routes for particular products. New and improved materials and processes have also been developed from this knowledge.

T201 explores these structure/properties/process relationships for a wide range of materials including plastics, metals, ceramics, glass, composites and some natural materials, and sets the technical considerations into the context of the economic and commercial factors which govern the successful use of materials.

The full-credit course consists of four 4-credit modules, the first of which, on materials principles, introduces the fundamental scientific and technological ideas that help us to understand the behaviour of materials and their exploitation, providing a foundation for the three subsequent modules. In each of the later modules these ideas are expanded and developed for more specialized purposes:

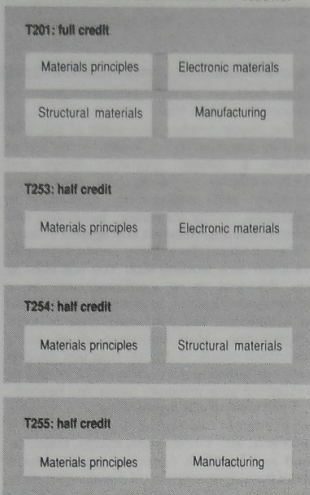
Electronic materials The emphasis here is on the extraordinary diversity of materials that are exploited for special electrical, electronic and magnetic properties, and on the researched nature of the industries involved. A selection of artefacts is examined: power machines (from conventional to superconducting), several clever transducers made of carefully tailored ceramic materials, and memories (including semiconductor and magnetic devices, and the magneto-optic disc).

Structural materials This module illustrates the breadth and diversity of materials that have been developed to meet a wide range of load-bearing applications. The interrelationships between structure, properties, processing and function are emphasized, and are exemplified by short case studies of actual products which also develop the theme of materials selection. The examples chosen cover not only the conventional engineering materials such as steel, plastics and ceramics, but also high-performance materials such as advanced composites and high temperature alloys, on the one hand, and more everyday materials such as textiles, paper and timber on the other. The frequent necessity of balancing the need for good mechanical performance with requirements such as environmental resistance, cost, ease of processing and mass of a product is highlighted in many of the case studies.

Manufacturing with materials While most of this module is taken up with the four principle materials processing techniques, casting, formation, cutting and joining, emphasis remains on the links between product design, process choice and materials selection. The design activity is charted from initial concept to a detailed specification for manufacture, stressing the role of materials selection and process choice and a method for choosing processes is introduced. By adopting a theoretical approach processes are modelled largely independently of the material being processed and this allows the likely performance of any process to be assessed. The latter part of the module is concerned with those areas of manufacturing operations that surround and influence the manufacturing process. These include marketing, costing and quality assurance. The need for effective market research and quality control is discussed and the methods by which manufacturing options can be compared using standard costing techniques are illustrated. Finally, a case study shows how manufacturing decisions involving product design, process choice and material selection lead to a diversity of products and manufacturing solutions in a highly competitive market.

As well as the full-credit course (T201), pairings of the 4-credit modules are also available as half-credit courses (T253, T254 and T255). So you can choose from a broad full-credit course and three, more specialized, half-credit courses. The half-credit courses will be particularly suitable if you wish to cover only those aspects of materials pertinent to, say, a certain special vocational interest, for instance T253 for electronic engineering, T254 for mechanical engineering and T255 for

production/manufacturing engineering. The whole scheme can be illustrated as follows:



NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T252], T253, T254, T255, [TS251].

Recommended prerequisites T102 and T281, or S102 and S271.

Although T201, T253, T254 and T255 are second-level courses, they are not suitable for students whose only relevant background is a foundation course in technology or science. They start at a level of physical science and mathematical skills equivalent to successful completion of T281 *Basic physical science for technology* and assume that you are familiar with the basic concepts and terminology of: Atomic structure and bonding; Chemical notation and reactions; Mechanics and elastic deformation; Electricity and magnetism; Thermal processes and perfect gases; Radiation, waves and quanta.

Of course you may have acquired the appropriate knowledge and skills from other studies.

If you need a more detailed guide to what we have assumed, and would like to assess your ability to recognize and cope with the ideas, notation and language used, you can obtain a self-diagnostic test. Write asking for the T201/253/254/255 diagnostic test, and enclosing a stamped, self-addressed A4 or A5 envelope to: The Course Manager, T201/253/254/255, Faculty of Technology, The Open University, Milton Keynes MK7 6AA.

Related courses T353, for which T201 or T254 is a recommended prerequisite. All other engineering-related technology courses.

Assessment (i) Eight TMAs and eight CMAs (50%); (ii) the examination (50%). Substitution can apply to up to two TMAs and two CMAs.

Broadcasts and cassettes Eight television programmes, and returnable video cassettes taking about four hours.

Residential school A one-week course-based summer school.

Students with disabilities These courses are not recommended for visually handicapped students, nor for those with impaired manual dexterity. If you have any other disability please ask your tutor-counsellor for advice. Course and supplementary materials are not available on tape.

Special features You must have a calculator.

T202 ANALOGUE AND DIGITAL ELECTRONICS

Second level: half credit

This course is intended to give you a thorough understanding of electronic principles, components, circuits and systems, and to develop the fundamental theoretical and practical skills required to carry out engineering analysis and design. It replaces the half-credit course [T283] *Introductory electronics*, with which it is an excluded combination. The extension to a full credit enables a wide range of topics to be treated in sufficient depth to provide a sound basis for an understanding of this rapidly developing subject area.

T202 provides essential background knowledge for third-level courses in electronics

and so is an important core course for students specializing in this area. It is also suitable for those in other disciplines who require a good working knowledge of electronics. But the treatment is by no means superficial and you should make sure that you have the necessary mathematical and scientific background (see prerequisites described below).

The central theme of the course is the analysis and design of analogue and digital circuits. To provide an understanding of these circuits, the first part of the course teaches the principles of the electronic components which form the basic building blocks, and also the application of appropriate mathematical methods of modelling components and circuits. The second part of the course looks at aspects of more complicated circuits and systems, such as filters, preamplifiers, power amplifiers, radios, computers and so on.

Practical skills in electronics are developed using the home kit, which includes a combined signal generator and oscilloscope, and at the residential school, where you will use a wider range of equipment and take part in more complicated projects than can be attempted with the home kit.

Computers now play an important role in the design process, and an innovation in this course is the use of a computer-aided design package to help with circuit design. You will need the use of a microcomputer that meets the University's home computing specification (see page 0).

Content The course teaches the principles of devices and circuits, with a substantial practical component provided by the home kit, and includes: AC circuit analysis, including step and frequency response, nodal analysis, and Thévenin and Norton equivalent circuits; properties of amplifiers, feedback and operational amplifiers; transistors and the design of integrated circuits; principles of digital electronics, including combinational and sequential logic circuits; digital-to-analogue and analogue-to-digital converters.

These principles are then used to study more complicated circuits and systems (with a substantial home kit element), including oscillators and filters in analogue-digital applications; design of an audio preamplifier and power amplifier; high-frequency aspects of analogue and digital circuits and interfacing.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T283], [TS282].

Recommended prerequisites T281 and TM282, or equivalent knowledge gained elsewhere, for example from HNC or ONC in mathematics, physics and/or electrical and electronic principles.

Assessment (i) Eight TMAs (25%); (ii) eight CMAs (25%); and (iii) the examination (50%). Substitution can apply to up to two TMAs and two CMAs. Some of the TMA questions are based on home and residential school experiments and computer work, which are an integral part of the course.

Residential school A one-week course-based summer school consisting of laboratory experiments and projects together with remedial lectures and tutorials.

Home kit There will be a considerable amount of electronic experimentation to be done at home, using a combined oscilloscope and signal generator together with other apparatus and components. You will need simple tools, a multimeter and a dry, flat surface measuring at least 1m x 1m to work on. The kit may not be taken or sent outside the United Kingdom.

Computing You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4).

Special features You will need a scientific calculator and a multimeter.

Students with disabilities This course is not suitable if you have a severe visual handicap and will be difficult if you have impaired manual dexterity.

T223

MICROPROCESSOR-BASED COMPUTERS

Second level: half credit

This course gives an introduction to the components and operation of microprocessor-based computers, that is the computers in general purpose devices such as the home computer, or those used in small dedicated control applications such as washing-machines or central-heating controllers. The emphasis of

the course is on the physical components although some simple programming is included. Home computing is used extensively to give you practical experience of the principles introduced.

The course will be useful for anyone who needs a basic knowledge of the components and operation of small computer systems, but it is not a 'computer awareness' course and goes beyond the introductory level. It does not attempt to teach programming or programming languages.

A temperature measurement application is used throughout the course to exemplify the principles. This application is studied at increasing levels of detail as the course progresses. Small changes are made to its operation as part of the practical work to reinforce the principles.

Content We begin with a brief history of computers, a survey of applications and an introduction to the main components of a microprocessor-based computer system. The temperature measurement system (TMS) is also introduced. The process of developing programs for computers is outlined and the C programming language is introduced so that you can perform simple experiments and make changes to the TMS program.

We examine methods of representing numbers and physical quantities in a form suitable for a computer and the basic operation of a simple computer processor, and look at the advantages and disadvantages of different programming languages. A substantial part of the course is devoted to input and output, often the most complicated part of a computer system. This is studied through a combination of practical and theoretical work. We look briefly at applications ranging from home computers to small control systems; the computer in the home kit is used as an example of a control application. The course ends with a brief survey of current developments and trends.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [TM221], [TM222].

Recommended prerequisites T102 (or the equivalent of its computing content). A working knowledge of MSDOS and GEM (copying and backing up disks etc.) is assumed. An introductory booklet is included in the first mailing to enable you to gain this knowledge before the course begins.

Complementary and related courses T202, M205, DT200.

Assessment Four TMAs (50%) and the examination (50%).

Broadcasts and cassettes There are no TV programmes. One or two audio cassettes may be supplied as an additional aid to studying some parts of the course material.

Home kit The temperature measurement system will use a small home experiment kit connected to your computer through its serial port. You will need to buy four RB14-type batteries for the kit.

Computing You will need continuous access to a microcomputer that meets the specification of the University's home computing policy. See page 4).

Students with disabilities If you have severely impaired sight or limited manual dexterity you may have difficulty with the practical work (about a quarter of the workload), although all of it is carried out at home. The course may not be suitable for blind students. Please ask the Office for Students with Disabilities for advice before registering.

T234 ENVIRONMENTAL CONTROL AND PUBLIC HEALTH

Second level: half credit

Last presentation 1992

This course gives you a basic understanding of our natural resources (land, air and water) and of related environmental problems. It will enable you to:

- Explain the necessity for conservation of land, air and water resources and for keeping pollution to a minimum.
- Quantify and assess the nature and extent of pollution, its dangers and its effects on the physical environment.
- Describe and discuss various methods of pollution identification, assessment, measurement and control available in the fields of land, air, water and noise pollution.

• Read, interpret and criticize published data, and perform relevant calculations in the fields of epidemiology, water supply, conservation, and environmental management. T234 is complementary to many areas of study in science and technology, such as engineering, environmental and urban management, resource planning, natural resources and environmental health. It lays the foundation for career development and keeping up to date in many environmental areas.

Content

Unit 1 deals with natural cycles, the time they take and the influence of man's intervention on natural processes.

Unit 2 on epidemiology describes the use of this subject in assessing the possible effect on health of environmental pollution.

Unit 3 on pollution chemistry is necessary for the home kit work and for an understanding of water and air pollution. If you have no knowledge of chemistry you may need to spend more time on this unit.

Units 4-6 on air pollution include the monitoring of pollutants, health and environmental effects, and methods of control, with reference to relevant legislation.

Units 7-10 discuss water supply, pollution and pollution control. The home experiment work is a central feature of these four units, ranging from a BOD test to a river quality survey.

Units 11-13 on noise pollution include monitoring of the health and environmental effects and methods of control, with reference to relevant legislation. Home experiments are included, e.g. measuring traffic noise.

Units 14-15 discuss the problems and methods of management (collection, disposal, reclamation) of domestic, hazardous and special wastes, including the relevant legislation.

Unit 16 discusses radioactive wastes and their management.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [PT272], which it replaces.

Recommended prerequisites T102 or S102 or T281.

Complementary and related courses Generally, Science Faculty: Earth science courses such as S238; Technology Faculty: design systems courses such as T274, T362. Social Sciences Faculty: planning, human geography and socioeconomic courses such as D205, D310 and U206.

Assessment (i) One TMA (8%); (ii) three TMAs (three projects linked to kit) (30%); (iii) two CMAs (12%); (iv) examination (50%). Substitution can apply to one CMA, and one TMA in (ii), but not to the project. There will also be two formative CMAs not used for assessment. (The course team feels that the nature of the course material and kit requires that all three project TMAs should be assessed, although a wide choice is available. You will receive comments on your formative CMAs.)

Broadcasts and cassettes Eight TV programmes reinforce the teaching material and home experiment work. Audio cassettes include material on legislation, help with home experiments and revision.

Home kit The main components are: a burette; a rainfall collection apparatus; a pH meter and a noise meter. All the items, although not complicated, are manufactured to a high standard of accuracy, comparable to industrial equipment. This kit may not be taken or sent outside the United Kingdom.

Students with disabilities Some problems are likely because of the home experiment work. Visual and aural impairment will affect satisfactory completion of experiments. If you have impaired manual dexterity you are strongly advised to seek specialist advice before registering for the course; it will be necessary to use glassware such as a burette for titration.

Set books There is one set book and one ancillary text: *The National Society of Clean Air Pollution Handbook* to cover the relevant legislation; this is used throughout the course. An order form for this book will be included in the first course mailing. Celia Kirby (1984) *Water in Great Britain* (2nd edn.) Penguin; part of the water block.

Special feature A calculator would be useful.

T235 ENGINEERING MECHANICS: SOLIDS

Second level: half credit

This course gives you a good introduction to the

fundamentals of solid mechanics, including statics and dynamics. This basic understanding is an important element in the training of engineers with a wide range of interests and specialisms. The course provides the basic analytical tools which design engineers need to create and assess the design of mechanical components and systems.

Content The course is divided into several principal areas of study: kinematics, statics, dynamics and structures. Kinematics is the representation and analysis of motion itself, that is the position, speed and acceleration of mechanisms and free bodies. Graphical methods in terms of velocity and acceleration diagrams are introduced. Statics is the study of forces in equilibrium and hence leads to an appreciation of the design of structures. Dynamics is the study of the relationship between force and motion. It tells us how to find the forces needed to cause a required motion or how to find the motion that will result from known forces. When the forces are known, their effect on the components of the structure or machine can be investigated, a process called stress analysis. The dynamics component includes the concepts of momentum, work, power and energy and the elements of vibration. The course is concluded by a case study.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T231] and [T232].

Recommended prerequisites No knowledge of engineering is required, but it is absolutely essential to have some mathematics skills, particularly geometry, algebra and calculus: M101 or TM282 offer suitable preparation.

Complementary and related courses T235 is an excellent preparation for a number of other courses, including T333, T394, MST204 and some third-level materials courses. It is the recommended prerequisite, as an alternative to [T232], for the third-level engineering mechanics course T331.

Assessment (i) Four TMAs (35%), (ii) eight CMAs (15%) and (iii) the examination (50%). Substitution can apply to one TMA and two CMAs.

Broadcasts and cassettes Eight TV programmes and some audio-visual cassettes.

Residential school A one-week course-based summer school offering design projects which require application of the principles taught in the course: experience of the relationship of analysis to design and of modelling to reality; revision of the course by tutor-supervised problem-solving.

Students with disabilities Serious impairment of sight or manual dexterity will make this course extremely difficult. Course and supplementary materials are not available on tape.

Special features You must have a scientific calculator and a simple set of drawing instruments.

T236 INTRODUCTION TO THERMOFLUID MECHANICS

Second level: half credit

T236 (new for 1992) is an introduction to the basic principles of thermodynamics and fluid mechanics, widely used in engineering design. It is a revision of the long-running [T233]; some work has been removed to give you a fairer load, and some detailed improvements have been made.

In the thermodynamics part, the emphasis is on energy processes in energy conversion engineering, for example in engines and power stations. We concentrate on working cycles and how to calculate work and heat exchanges. The fluid dynamics sections are about fluid flows (including flow visualization) and how fluids can be used to exert forces and do work, for example in turbines in hydro-electric plant. Throughout the course we try to give you a sound understanding of the fundamental principles, and there are plenty of practical examples. The material is an important part of any general engineering degree, and is of course essential preparation if you wish to study fluid mechanics or thermodynamics at a higher level.

The course is designed to teach the basic analytical methods of thermodynamics and fluid mechanics, and to introduce the use of these methods in engineering design. It should enable you to:

- Apply thermodynamic and fluid modelling to real systems.
- Choose appropriate control volumes.
- Perform 'first law' thermodynamic analyses (energy).
- Perform 'second law' thermodynamic analyses (entropy).
- Analyse gas and vapour power cycles.
- Use first and second laws for flow processes.
- Describe basic fluid flow phenomena.
- Apply similarity analyses to fluid flows.
- Solve pressure problems in fluid statics.
- Apply energy analyses to fluid flows, including friction.
- Apply force-momentum analyses to fluid flows.
- Analyse fluid systems including, for example, the selection of pumps.

Content

Unit 1 introduces energy and thermodynamics and shows how energy can be transferred by heating and working. The first and second laws of thermodynamics are introduced, and modelling and energy analyses of thermofluid systems are considered.

Unit 2 The first law of thermodynamics for non-flow processes; thermodynamic properties and state; internal energy and total energy; gas laws and thermodynamic relationships; processes.

Unit 3 The second law of thermodynamics; availability and irreversibility; heat engines; the Carnot and Stirling cycles; heat pumps; efficiency and coefficient of performance.

Unit 4 Availability energy and entropy.

Unit 5 Introduction to fluids; the continuum model; fluid properties and fluid flow phenomena; the mass continuity equation; fluids in motion, introduction to fluid flow with observation of fluid phenomena; laminar and turbulent flow.

Unit 6 Similarity analysis and dimensionless groups. This unit introduces a technique which is fundamental to physical modelling, and the analysis of various fluid phenomena.

Units 7, 8 and 9 Fluid mechanics; energy analysis, Bernoulli's equation; internal flows; pipe flow.

Unit 10 Fluid momentum, and how the flow of a fluid can exert forces.

Unit 11 Inside fluid machines — the design of pumps and turbines.

Unit 12 Fluid systems — putting fluid systems together for good performance.

Units 13 and 14 The first and second laws of thermodynamics for flow processes; control volume analysis; steady-state energy balance; entropy balance; introduction to tables of thermodynamic properties.

Unit 15 Power cycles and power stations.

Unit 16 Structured help with revision and approaches to examination questions.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T231] and [T233].

Recommended prerequisites The strongly recommended prerequisite is either [T232]/T235 or TM282. If you have passed either [MST282] or MST204 you should also be equipped for this course.

Assessment Four TMAs (35%), eight CMAs (15%) and the examination (50%).

Broadcasts and cassettes There are eight TV programmes (they may be on video cassette) and several audio cassettes.

Students with disabilities If you cannot make full use of television you will be at a significant disadvantage.

Set books G.F.C. Rogers and Y.R. Mayhew *Thermodynamics and Transport Properties of Fluids (SI Units)*, Basil Blackwell (3rd or later edition).

Special feature You will need a scientific calculator.

T244 MANAGING IN ORGANIZATIONS

Second level: half credit

If managing were something that you could be easily taught it would not be such a problem. In fact, a great deal is simply learned by experience, and one purpose of this course is to

help you learn from and make sense of your own experiences in organizations. So the course is decidedly practical: it is appropriate for anyone who has to get things done with or through other people and may be especially suitable for those moving into positions with greater managerial or administrative responsibilities, perhaps from a more technical background.

The course's aim is not just to teach a number of 'tools for thought' applicable to organizational matters but to ensure that you can apply them to your own organizational life. It will help you to see your own work in a wider context; to understand better your organizational relationships (whether interdepartmental or supervisory); to recognize when your initial interpretation of problems may be inadequate; and to know how to go about generating a more rounded understanding of and response to complicated issues.

Content The course neither uses nor teaches mathematics.

Block 1 Problems about organizations (2 units) introduces the course and its scope by discussing the nature of organizations and their problems. Some conventional ideas about organizations and organizational problem-solving are called into question.

Block 2 Work groups (4 units) explains practical concepts in individual and group psychology to account for the frustrating (and the creative) ways in which organizational relationships can develop. The 'control model' is introduced as a simple framework for thinking about the control of processes, tasks and workgroups.

Block 3 Organizations (5 units) deals with organizational structures and processes, with power and conflict, and with decision-making. Several more practical frameworks for thinking about problems are taught and a wide range of organizational problems and practices are discussed along the way.

Block 4 Inter-organizational relations (3 units) demonstrates that inter-organizational relationships frequently provide the wider context needed to make sense of events and difficulties. Market (self-regulation) and institutional (hierarchical) patterns of inter-organizational relations are contrasted, and some reasons why neither works quite as intended are explored.

Block 5 Wider perspectives (2 units) draws together some of the systems ideas which have been built into the course and prepares for part of the examination by giving a structured exercise around a case study. The last unit provides further integration of the course material, but from an entirely different point of view.

NOTES FOR PROSPECTIVE STUDENTS

Current organizational involvement The course requires you to apply course concepts to your own experience in organizations, so anyone whose involvement with people (other than family) is severely restricted, infrequent, or casual will be handicapped by lack of such experience to draw upon in answering assignments. But you need not be currently in paid employment. Many students have successfully met the demands of the course on the basis of involvement in, for example, voluntary organizations. Certainly the possession of a job with the title 'Manager' is by no means necessary. The great majority of intending students find that their organizational involvement provides an ample basis. If you have particular grounds for doubt about the extent of your organizational involvement please ask your regional technology staff tutor or the T244 course manager at Walton Hall for advice.

Excluded combinations [T242], [T243].

Complementary and related courses T301, [T241], T247, T274, [T341], TD342, [PT281], [D208], [DE351], E333, [E323], [E324], [D336], DE325. To help students who wish to take T247 in the same year as T244, a joint study guide is provided: these courses share the same broadcasting 'slot', and assignment dates are staggered.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA.

Broadcasts and cassettes Five TV programmes exemplify concepts discussed in the units. Four other programmes are relevant to the residential school. Audio cassettes are used in two ways: for direct teaching, as with diagramming techniques, and to support the TV programmes with additional material.

Residential school A one-week discipline-based summer school shared with one of the other second-level systems courses, T247. Attendance at the school is required only once, as long as you do both courses either concurrently or in successive years and pass at least one of them.

Students with disabilities If you have a visual handicap there may be difficulties arising from the reading load or the considerable dependence on diagrams. If you have impaired hearing you should note that TV and cassette material is important for TMA's. The residential school may be difficult for you if you have severe restriction of mobility.

Set book R. Paton *et al.* (eds.) *Organizations: Cases, Issues, Concepts*, Paul Chapman Publishing, used throughout the course.

Preparatory reading R. Carter *et al.* *Systems, Management and Change: a Graphic Guide*, Paul Chapman Publishing; D.S. Pugh *et al.* (eds.) *Writers on Organizations*, Penguin. You are not expected to buy these books.

T247 WORKING WITH SYSTEMS

Second level: half credit

We depend on health and financial systems, and they depend on information systems. We call parts of our bodies systems and insecticides systemic. We all work in and with these complex systems and we don't really understand them. We haven't got the time or the information to think through all interactions which made the systems as they are and which determine the success or failure of what we do. We probably haven't got the mental capacity either. So in order to be effective we need to adopt a different way of thinking about these systems. This course teaches this distinctive and practical way of thinking.

The course will be of interest to anyone who has had the experience of being intrigued, puzzled, frustrated, trapped or enraged by the behaviour of a system and wants to make it work better next time. Such people could be managers at any level in the public, private or voluntary sectors, technologists in engineering or computing, NHS medical staff or administrators — in fact, the course has relevance for most jobs in a highly developed and interdependent society.

There are two kinds of content, topics and skills. Topics include the processing of work through a factory or office, ethical investments, pests and pesticides on crops, managing change in organizations, medical diagnosis and how groups make decisions. So there are examples of many different kinds of systems. The main skill taught is modelling. By the end of the course you will be able to build and use models of various kinds, particularly spreadsheet models on a microcomputer, to help you to generate and try out new ideas for changing and improving the functioning of a wide variety of systems.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T241].

Assessment Four TMAs, two CMAs and the examination.

Broadcasting Four TV programmes and two audio cassettes.

Computing You will need access to a microcomputer that meets the specification of the University's home computing policy (see page 4). Audio cassettes will be included in the computing material. If you have not studied T102 or have no equivalent computing skills you will have to work through a short starter pack before the course begins. We do not yet know whether this will be free; it may cost you about £20.

Residential school A one-week discipline-based summer school.

Students with disabilities Using the computer screen and keyboard may be difficult if you have impaired sight or manual dexterity. Course and supplementary materials are not available on tape in 1992, but will be in later years.

T253 MATERIALS FOR ELECTRONICS

Second level: half credit

For aims and content of this course please see the entry for T201.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations T201, [T252], T254, T255, [TS252].

Recommended prerequisites T102 and T281 or S102 and S271.

Although T201, T253, T254 and T255 are second-level courses, they are not suitable for students whose only relevant background is a foundation course in technology or science. They start at a level of physical science and mathematical skills equivalent to successful completion of T281 *Basic physical science for technology* and assume that you are familiar with the basic concepts and terminology of: Atomic structure and bonding; Chemical notation and reactions; Mechanics and elastic deformation; Electricity and magnetism; Thermal processes and perfect gases; Radiation, waves and quanta.

Of course you may have acquired the appropriate knowledge and skills from other studies.

If you need a more detailed guide to what we have assumed, and would like to assess your ability to recognize and cope with the ideas, notation and language used, you can obtain a self-diagnostic test. To do so, write asking for the T201/253/254/255 diagnostic test, and enclosing a stamped, self-addressed A4 or A5 envelope; to: The Course Manager, T201/253/254/255, Faculty of Technology, The Open University, Milton Keynes MK7 6AA.

Related courses T202, T393 and other electronics courses.

Assessment (i) Four TMAs, (ii) four CMAs (50%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Cassettes There are returnable video cassettes taking about four hours. About half is devoted to 25-minute programmes and the rest is divided into smaller sections and linked to topics in the course.

Residential school A one-week course-based summer school held with the T254 and T255 school; some activities will be undertaken jointly with those courses.

Students with disabilities The course is not recommended for visually handicapped students, nor for those with impaired manual dexterity. If you have any other disability please ask your tutor-counsellor for advice. Course and supplementary materials are not available on tape.

Special feature You must have a calculator.

T254 STRESS ON MATERIALS

Second level: half credit

For the aims and content of this course please see the entry for T201.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations T201, [T252], T253 and T255, [TS251].

Recommended prerequisites T102 and T281 or S102 and S271.

Although T201, T253, T254 and T255 are second-level courses, they are not suitable for students whose only relevant background is a foundation course in technology or science. They start at a level of physical science and mathematical skills equivalent to successful completion of T281 *Basic physical science for technology* and assume that you are familiar with the basic concepts and terminology of: Atomic structure and bonding; Chemical notation and reactions; Mechanics and elastic deformation; Electricity and magnetism; Thermal processes and perfect gases; Radiation, waves and quanta.

Of course you may have acquired the appropriate knowledge and skills from other studies. If you need a more detailed guide to what we have assumed, and would like to assess your ability to recognize and cope with the ideas, notation and language used, you can obtain a self-diagnostic test. To do so, write asking for the T201/253/254/255 diagnostic test, and enclosing a stamped, self-addressed A4 or A5 envelope; to: The Course Manager, T201/253/254/255, Faculty of Technology, The Open University, Milton Keynes MK7 6AA.

Related courses T353 for which T254 (or T201) will be a recommended prerequisite, [T232], T235, T331 and [T392].

Assessment (i) Four TMAs, (ii) four CMAs (50%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Cassettes There are returnable video cassettes taking about four hours. About half is devoted to 25-minute programmes and the rest is divided into smaller sections and linked to topics in the course.

Residential school A one-week course-based summer school held with the T253 and T255 school; some activities will be undertaken jointly with those courses.

Students with disabilities The course is not

recommended for visually handicapped students, nor for those with impaired manual dexterity. If you have any other disability please ask your tutor-counsellor for advice. Course and supplementary materials are not available on tape.

Special feature You must have a calculator.

T255 MATERIALS IN MANUFACTURING

Second level: half credit

For the aims and content of this course please see the entry for T201.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations T201, [T252], T253 and T255, [TS251].

Recommended prerequisites T102 and T281 or S102 and S271.

Although T201, T253, T254 and T255 are second-level courses, they are not suitable for students whose only relevant background is a foundation course in technology or science. They start at a level of physical science and mathematical skills equivalent to successful completion of T281 *Basic physical science for technology* and assume that you are familiar with the basic concepts and terminology of: Atomic structure and bonding; Chemical notation and reactions; Mechanics and elastic deformation; Electricity and magnetism; Thermal processes and perfect gases; Radiation, waves and quanta.

Of course you may have acquired the appropriate knowledge and skills from other studies. If you need a more detailed guide to what we have assumed, and would like to assess your ability to recognize and cope with the ideas, notation and language used, you can obtain a self-diagnostic test. To do so, write asking for the T201/253/254/255 diagnostic test, and enclosing a stamped, self-addressed A4 or A5 envelope; to: The Course Manager, T201/253/254/255, Faculty of Technology, The Open University, Milton Keynes MK7 6AA.

Related courses This course will complement a range of design and systems courses as well as other courses in materials.

Assessment (i) Four TMAs, (ii) four CMAs (50%); (iii) the examination (50%). Substitution can apply.

Cassettes There are returnable video cassettes taking about four hours. About half is devoted to 25-minute programmes and the rest is divided into smaller sections and linked to topics in the course.

Residential school A one-week course-based summer school held with the T253 and T254 school; some activities will be undertaken jointly with those courses.

Students with disabilities The course is not recommended for visually handicapped students, nor for those with impaired manual dexterity. If you have any other disability please ask your tutor-counsellor for advice. Course and supplementary materials are not available on tape.

Special feature You must have a calculator.

T264 DESIGN: PRINCIPLES AND PRACTICE

Second level: half credit

This course should make the subject of design relevant, accessible and interesting to technologists and non-technologists alike. People encounter the products of design every day of their lives and yet often have a hazy, partial or haphazard understanding of what goes into the design, development and making of those products. Our intention is not to train you to become a professional designer but, by teaching you something about the design processes that generate particular products and giving you practice in basic design skills, to develop your understanding of what it is like to be a designer. If you have a detailed knowledge of one area of design, or are a designer already, the course should broaden your experience by offering comparisons with other fields of design and showing relationships between design principles and practices.

The course has three main aims:

- To develop your design awareness by investigating how decisions are made about the

design of artefacts, the influences that contribute to these decisions and the nature of the design process, so that you are in a position to make analytical and critical judgements about designed objects.

- To develop your understanding of design principles applicable across a variety of professional practices such as engineering, product design, architecture.
- To develop your design skills by giving examples, instruction and experience in the use of basic techniques of designing, such as drawing and modelling.

Content After a general introduction which examines the nature of design and the design process, a series of blocks highlights each of the main phases of the product development process — from initial planning through conceptual and layout design to development for manufacture and use. Selected products are used to illustrate the principles and practice of design, including consumer products, bicycles, houses and cars. You will be able to apply what you have learned from the course to guided design exercises which ask you to specify and design a simple product. The exercises run throughout the course, linked to each block and forming a part of each TMA. You will not be left unaided: information and sample design ideas are provided at each stage.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T263], [T262].

Recommended prerequisites There are no formal prerequisites. The course does not assume that you have any design experience or any special mathematical or technical knowledge. You will be taught all the concepts and skills you need.

Complementary and related courses We expect that the course will be of particular interest to students taking the broader courses in technology, particularly [T241]/T247, T244 or T274. The contextual problems of design could be further pursued in courses such as T362 and T301. More specialized aspects of design could be taken up in T201, TM282 and TM361. T264 is a recommended prerequisite for T363 *Computer-aided design*.

Assessment Five TMAs (50%) and the examination (50%). Substitution can apply to one TMA. Within the text there are short non-assessed exercises intended to improve your design skills, acting as rehearsals for elements of the TMA, and practice exam-type questions.

Cassettes There are five sixty-minute video cassettes. Since design is a visual subject, these are an integral part of the course. There are also three sixty-minute and one thirty-minute audio cassettes, all accompanied by study notes. You must have the use of both video and audio cassette players.

Home kit The kit includes drawing equipment (board, instruments, tracing paper, work book); materials for making models (foam plastic, wire); and some sample components from manufactured products.

Students with disabilities If you have a visual handicap or impaired manual dexterity you are likely to find the TMAs difficult. Course and supplementary materials are not available on tape in 1992.

T274 FOOD PRODUCTION SYSTEMS

Second level: half credit

Food is essential for life, and its availability and price are of concern to everyone; its production, processing and distribution are of special interest to those working in agriculture and the food industry and also to the amateur cook or gardener. The course analyses the production and supply of food on a world scale, to see how it takes place and how it may change or be changed in the future.

The course encourages you to bring together skills from a wide range of disciplines in analysing a systems approach to complex problems like that of food supply. More specialized aims are:

- To provide an understanding of the principles involved in the production, processing and distribution of food.
- To show how social, political and economic factors affect the demand for food and how food is produced.
- To enable you to comment critically on the causes and effects of changes in the production of food.

Content Unit 1 introduces the nature and estimates the magnitude of the world's food problem. Unit 2 looks at the nutritional needs of human beings; it includes a detailed analysis of your own diet over a short period. Units 3-5 concentrate on the growing of crops, showing how the production of useful food products can be increased, and loss to pests and diseases kept to a minimum. Unit 6 looks at the use of animals as a source of milk and meat and at the factors which influence their efficiency. Units 7 and 8 are about the chemical, microbiological and engineering aspects of industrial and domestic processing of foodstuff.

Unit 9 is a case study on bread which also shows how the technical processes are influenced by the needs and wants of the producer and consumer, subjects treated in more detail in Units 10 and 11. Consumer and producer do not operate in isolation, but within an organizational framework for the provision of land, food distribution and storage, studied in Units 12 and 13. The interactions between people and organizations depend on political decisions which govern national priorities for the allocation of resources to food production or other activities, and on world trade (Units 14 and 15). The last unit makes use of knowledge and skills gained from the course, within a systems framework.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T273].

Recommended prerequisites A pass in one of the science, technology or social sciences foundation courses. Any necessary specialized vocabulary is taught during the course, but familiarity with the elementary ideas of biology, chemistry and mathematics would be helpful. There is a preliminary test and recommended introductory reading on these topics in the first supplementary materials, but if you feel unsure of these topics you might wish to examine the biology and mathematics tributaries for T102.

Complementary courses The course fits closely with other technology, science and social science courses dealing with applied biological and economic problems, such as: T234, [S202]/S203, U205, [T263], [S299], [D208], S238. Several of the topics in the first half of the course are treated in greater depth in S236. T274 also complements the systems courses T247 and T244. See the faculty overview for the systems second-level profile.

Assessment (i) Four TMAs (30%); (ii) six CMAs (20%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA. One TMA is based on the diet study, and it would be helpful to have attended the half-day school which takes place early in the course.

Boardcasts and cassettes Eight TV programmes and eight audio cassette tracks cover case material and concepts which are difficult to present as text, or are used to show situations which are inaccessible to most students. Reference to these materials is frequently required to answer TMA and CMA questions.

Students with disabilities If you have a severe visual handicap you may find problems arising from the extensive use of graphs and diagrams.

Calculator Some form of calculator or computer for the diet study would be useful but is not necessary.

T281

BASIC PHYSICAL SCIENCE FOR TECHNOLOGY

Second level: half credit

It has long been felt that there is a need to strengthen the scientific knowledge of those who wish to take the more technical courses in the Technology Faculty. T102, the technology foundation course, begins this process and T281 builds on this foundation to give a logical treatment of some topics in science which are fundamental to higher-level technology courses. An important aspect of the course, however, is that it emphasizes the use of science as a tool in performing the sort of calculations frequently demanded of engineers.

There are therefore three main aims:

- To provide the kind of scientific literacy needed by most technologists.
- To teach the basic science most students need to bridge the gap between the technology foundation course and many second-level technology courses.
- To develop the skills required for the use of this scientific knowledge in dealing with simple technological examples. The mathematics required by this course is that reached by

TM282. If you are in doubt about your mathematical skills you are strongly advised to take TM282 before attempting T281. If you are not, you may find it useful to do the two courses together in the same year. The notation used in this course is compatible with that used in TM282 and in S271.

Content Many of the topics dealt with in the course will be familiar to anyone who has studied A level, HNC or HND, but the emphasis is somewhat different in that we are seeking to apply the science whenever possible to technology. In addition, some topics are dealt with in more detail than in an A level, HNC or HND course. The following list of unit contents should therefore be treated as a guide to what is taught and not how it is taught.

- 1 Motion, Newton's Laws and friction.
- 2 Work and energy, density, flotation and pressure.
- 3 Deformation of solids, liquids and gases.
- 4 Temperature, heat, thermal expansion and heat transfer, elementary thermodynamics.
- 5 The 'billiard ball' model of atoms and kinetic theory.
- 6 Atoms as chemical species, the periodic table and an introduction to chemical equations.
- 7 Chemical equilibrium, the concept of equilibrium constant, pH and solubility.
- 8 Rate of reaction, rate constant and the interdependence of rate and equilibrium.
- 9 Thermochemistry, Hess's Law and the energy changes occurring in chemical reactions.
- 10 Voltage, current and resistance, electric fields and capacitance. Measuring voltage and current.
- 11 Electrostatic and magnetic fields.
- 12 Electromagnetic induction.
- 13 Alternating current. Capacitance, inductance, impedance in a.c. circuits. Power in a.c. circuits.
- 14 Electrical instruments.
- 15 Wave motion, interference and diffraction.
- 16 Geometrical optics with special reference to optical instruments and their performance.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [T101]/T102 and TM282 are the only recommended prerequisites. If you have studied [S101] or S102 you would also be able to take T281 without difficulty.

Complementary and related courses T281 is intended as a basic science course underpinning most of the higher-level technology courses. It would be a useful complement to S271.

Assessment (i) Four TMAs (30%); (ii) four CMAs (20%); (iii) the examination (50%). Substitution can apply to one TMA, except TMA 04, and one CMA. There are also four formative CMAs which are used as remedial exercises. They are marked in the usual way; the scores are not used for assessment, but diagnostic feedback is provided, with answers, in order to indicate where revision is needed.

Broadcasts and cassettes There are eight TV programmes. These amplify topics dealt with in the course units, and by approaching the material in a different way should help to answer at least some of your problems. There are three audio cassettes with an accompanying illustrated book.

Residential school A one-week course-based summer school, giving you an intensive week of laboratory work and with an extensive tutorial programme.

Students with disabilities This course should present no particular difficulties but inability to attend laboratory sessions at the residential school would prevent you from reaping the full benefit of the course. The course team at Walton Hall will advise on the suitability of the course for you.

Preparatory reading There is no recommended preparatory reading, but if you have not studied O or A level science or maths you could profitably look at some of the modern GCSE and A level textbooks available in most local libraries.

Special feature You will need a calculator.

T292

INSTRUMENTATION

Second level: half credit

Have you ever wondered how physical quantities can be measured and converted into signals for transmission, display and recording?

The aim of this course is to explain the function and operation of components which achieve this and to show how they can be incorporated into instrumentation systems. The course explains the fundamental physical principles involved in measurement, together with the characteristics of transducers, signal conditioning, display and recording devices, such as accuracy, interference, step response and frequency response. Current industrial practice is illustrated by a number of manufacturers' specifications for these devices; interpreting and applying such specifications is part of the course.

Content T292 is about instrumentation systems for measuring, transmitting and recording the values of common physical quantities. It does not cover chemical analytical instrumentation.

Blocks 1 to 3 Transducers and signal processing devices are described for the measurement of liquid level, strain, linear and angular displacement, velocity, flow rate, acceleration, vibration, force, pressure and temperature.

Blocks 4 and 5 describe methods of signal conditioning, the problems of noise and interference and methods of reducing their effect, together with transmission techniques.

Block 6 covers display, recording and data-logging devices.

Block 7 presents two case studies showing industrial applications.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T291].

Recommended prerequisites The ideal preparation for this course is T281 for the physics background and TM282 for the mathematics background (or at a more detailed level S271 and MST204). If you have not studied these courses you should have an understanding of such physical quantities as force, pressure, strain, acceleration, density, current, voltage and capacitance, together with a familiarity with some of the basic laws of physics such as Newton's second law, Ohm's law and Kirchhoff's laws. The mathematical skills required include manipulating algebraic expressions and using trigonometric and exponential functions. Some familiarity with first and second-order differential equations would be of benefit. You will not be expected to solve the equations but they are used to determine important step and frequency response characteristics. If you wish to check that your mathematical knowledge is sufficient for this course, you can obtain a maths quiz by sending a stamped self-addressed envelope to the T292 Course Manager, Faculty of Technology, The Open University, Milton Keynes MK7 6AA.

Complementary and related courses T292 is suitable preparation for courses in applied and experimental sciences and technology. It is a recommended prerequisite for T394.

Assessment (i) Four TMAs (25%); (ii) four CMAs (25%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts Three TV programmes.

Residential school Much of the one-week course-based summer school consists of laboratory experiments. There is also a substantial programme of lectures and tutorials revising the main parts of the course.

Students with disabilities The many diagrams in the course texts may cause difficulty if you have severe visual handicap. Those with severely impaired manual dexterity may have difficulty at the residential school. Course and supplementary materials are not available on tape.

Set book R. Loxton and P. Pope *Instrumentation: a Reader*, Open University Press (course reader).

T301

COMPLEXITY, MANAGEMENT AND CHANGE: APPLYING A SYSTEMS APPROACH

Third level: full credit

This course will enable you to apply systems ideas and methods to difficult issues in the real world.

Content All of us are involved in management — in its widest sense — whether it is public, private or personal, playschools or prisons, people or products. How we organize ourselves to tackle things is a mixture of intuition, experience and skills.

Simple problems may require only simple skills, but a systems approach starts from the premise that the decisions people face in the real world cannot be neatly classified and separated into individual problems with simple solutions. They are much more likely to be what the American management writer Russell Ackoff calls 'messes', i.e. 'systems of inter-related problems'. T301 provides skills, techniques and experience to help to deal with such problems arising in complex human systems like companies, schools and governments.

The course should be of particular interest to those who have to deal with intransigent human and technical problems either in short-term tactical ways or in the development of longer-term strategies for innovation and change.

The main aim of the course is to teach you to use systems methods to understand complicated situations, model them, consider the systems consequences of various actions and, in collaboration with others, take action to improve the original situation.

The course is centred around the teaching of three complementary systems approaches:

- The analysis of systems failures and catastrophes.
- A systems modelling approach to organizational decision-making.
- A systems approach to organizational change.

You will apply one of these approaches in an extended project. The main teaching takes place during the first twenty weeks of the course and is followed by ten weeks of project work, with a final two weeks of study during which the themes in the course are drawn together.

Block 1 Systems ideas, background and philosophy (2 weeks) introduces systems concepts and the essential features of a systems approach including its nature and phases. Block 1 should bring all students to a common level of understanding, and contains much that will interest continuing systems students as well as providing the grounding in systems ideas that new students will need.

Block II The analysis of systems failures (5 weeks) is concerned with developing a practical understanding of a variety of failures ranging from small-scale incidents to large catastrophes, and from local problems to questions of regional or national policy. Particular attention is paid to the human element and the relationship between failure, or alleged failure, and the objectives and expectations of the individuals, groups and organizations concerned.

The block begins with accounts and explanations of failures some of which are indisputable and others where failure is a matter of value judgement rather than a universally recognizable state. The particular approach used in this block for understanding failure is presented and you practise applying it.

The approach recognizes that failure is the outcome of complex activities and applies systems insights in order to identify the origins of deficiencies and mistakes and how they were allowed to develop. The aim is to arrive at a systemic understanding of a situation as a preparation for the later blocks in the course which deal with planning and making changes.

Block III A systems modelling approach to organizational decision-making (6 weeks) studies systems which are amenable to precise modelling and definitions. The 'hard systems approach' which it teaches can be used to solve management problems and aid decision-making when the system's objectives can be defined clearly and unequivocally. The introductory unit outlines the approach taught in T301, its development, and the role of modelling within it. Its use is then illustrated in case study material based on research and development decision-making in the agrochemical industry.

The process of mathematical modelling is described and discussed and a range of modelling techniques is introduced to give you a basis for judging what kinds of model might be appropriate in different circumstances.

Block IV A systems approach to clarifying and facilitating organizational change (5 weeks) When there is agreement about what is wrong and about what would constitute an acceptable state of affairs, the modelling approach described in Block III is both appropriate and powerful. However, many real problems are not like that: the people involved have conflicting perceptions of the actual state of affairs, different ideas of what 'the problem' is, and different ideas about what might constitute a 'solution' or improvement.

To cope with such situations, the so-called 'soft' systems approach has evolved. This is an established and tested method for using systems ideas to help people understand the problems in which they are involved, and to help them

identify beneficial policies and actions. Through a series of exercises, you are taught the basic steps of a soft systems approach and given some initial experience of using it in a structured mini-project.

Block V Comparing systems approaches (2 weeks) reconsiders the three approaches studied in Blocks II-IV and discusses the problems of choosing an approach.

Block VI (10 weeks) You apply one of the three approaches to an appropriate situation. Guidance on how to undertake project work and suitable topics for each approach will be provided. Subject to certain restrictions you can select a topic other than one of those provided by the course team.

Block VII (2 weeks) considers the difficulties associated with the practical application of systems approaches along with advice on how to plan future systems applications.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [T341] and [TD342].

Complementary and related courses This course fits naturally into any degree profile which requires some orientation towards action in the real world whether it is in management, technology or education. Together with the second-level systems courses [T241], T247 and T244 it provides the core of several profiles of the form 'systems and...' etc. If you wish to undertake a systems project in T401 you will normally be expected to have completed T301.

Assessment (i) General systems, one TMA (4%); (ii) systems approaches, four TMAs (28%); (iii) project, two TMAs (18%); (iv) the examination (50%). Substitution can apply to one TMA in systems approaches only. There is also one formative TMA associated with the project, and one formative CMA.

Cassettes There are five audio cassettes.

Computing If you choose to apply the hard systems approach in your project you must have access to a personal computer with MS-DOS.

Students with disabilities The project (depending on the topic chosen) may require use of a computer terminal, visits to libraries or contact with officials and groups in the local community. Visually handicapped students may find difficulties, as diagrams are used extensively throughout the course. Course and supplementary materials are not available on tape.

Preparatory reading If you wish to do some preparation you should read the introductory units to the second-level systems course and the set books for this course.

Set books R. Carter, J. Martin, B. Mayblin and M. Munday, *Systems, Management and Change*, Paul Chapman Publishing (course reader, needed for Block 1); V. Bignell and J. Fortune (1983) *Understanding Systems Failures*, Manchester University Press (needed for Block II).

T322 DIGITAL TELECOMMUNICATIONS

Third level: half credit

The techniques, applications and scope of telecommunications are changing very fast. The availability of cheap integrated circuits is leading to increasingly complex forms of signal processing. New media such as optical fibres allow vast amounts of digitally coded information to be transmitted over long distances with extremely low error rates. The electronic storage of signals and control information at the nodes of telecommunication networks allows optimum use of equipment and channels, and the smoothing out of demand peaks.

This course introduces important concepts and techniques relevant to the design and operation of complex modern telecommunications and information technology. Because of the increasing importance of distributed storage and processing in computer systems and of local area networks (LANs), the course is also appropriate if you are interested in computing. Some basic electronics and mathematics is required.

Because the subject is expanding so rapidly, the main objective of the course is to enable you to understand and evaluate both current and future systems and techniques. It is not possible, in a half-credit course, to develop expertise in the application of individual techniques, but the use of some of these is illustrated through case studies. Although the material was designed for an undergraduate course, most of it was first presented as part of two short courses in the associate programme (PT628 and PT629).

Content Survey of systems currently in use or under development, followed by an introduction to the basic properties of digital signals.

First system study Electronic mail systems. Introduction of protocols and layered systems, particularly OSI (open systems interconnection).

Reliability, traffic information and coding for error detection and correction The operation of telecommunication systems depends on statistical information about signal properties, demand for service and transmission impairments. This group of units develops and applies essential probabilistic concepts.

Digital signals Time and frequency domain models of digital signals; encoding, decoding and transmission of digital telephone signals.

Noise Sources and characterization; noise in circuits and systems; threshold detection and error rates.

Digital coding and modulation Basic principles relevant to the transmission and error control of digital signals; modems, scramblers, convolutional coding.

Second system study Digital exchanges; principles of exchange architecture and signalling; organization, specification and use of telecommunications software.

Transmission Principles of electrical and optical transmission on lines, cables and wave guides.

Third system study An optical fibre transmission system in the telephone network. This deals with the design of system elements and illustrates practical applications of many of the principles introduced previously.

Fourth system study Digital networks. This is mainly about network topologies and organization, protocols and standards.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T321] (under review).

Recommended prerequisites [T283], T202 or T292. Also, one credit's worth of mathematics, such as M101 or preferably MST204.

Related courses ST291, [SM352]/SMT356, M245, DT200, T292, [T283], [T326], T393, TM361, [TS282].

Assessment (i) TMAs 01-04 (35%); (ii) CMAs 41-44 (15%); (iii) examination (50%). Substitution can apply to one TMA and one CMA. CMA 51 is formative and not used for assessment.

Cassettes Three audio cassettes.

Students with disabilities The course contains relatively complex visual material which is difficult to transfer to alternative media. Course and supplementary materials are not available on tape.

T331 ENGINEERING MECHANICS: SOLIDS AND FLUIDS

Third level: half credit

'Engineering mechanics' as a subject covers the theoretical methods used by engineers in the design of mechanical artefacts such as buildings and bridges, road vehicles, ships, engines, spacecraft and so on. The fundamental principles involved were introduced in [T232]/T235. In T331 the principles are further extended, making it possible to introduce many new, more advanced and interesting problems. The essence of the course, therefore, is the principles of engineering mechanics and their application to design in the hands, or at least in the mind, of the creative engineer.

Content The course is presented in five blocks, the first four introducing material while the last is mainly devoted to revision. The subject matter includes solids and fluids, but excludes thermodynamics.

Block 1 considers various principles and problems arising from the design of mechanisms and machinery. This is essentially the control of motion, thus leading to the study of various kinematic principles by graphical and vector methods. Once the required motions are established, the forces must be considered, bringing in the study of kinetics, which combined with kinematics gives dynamics. This block includes some review and revision of the prerequisite course [T232]/T235 from a new more advanced

point of view, and introduces new methods and concepts.

The second block deals with structural analysis, including such topics as beam deflections, structural instability, buckling problems and indeterminate structures.

The study of structural loads and forces often requires the consideration of the effect of fluid flows. Block 3 investigates the problem of determining the forces exerted by fluids, and many examples are discussed: the design of cars and aircraft; extreme wind forces on buildings; wave forces on offshore structures and pipelines, and so on.

Vibration problems are very common in practical engineering, and are often the cause of the unexpected failure. The fourth block explores vibration dynamics and vibration analysis of one-, two- and multi-degree of freedom systems, including such factors as natural frequencies, node shapes and resonance. These provide the tools required to prevent vibration problems at the design stage, or to understand and rectify them retrospectively.

The last block is devoted to organized revision and preparation for the examination.

The emphasis throughout the course is on realistic problem-solving in a design context. You will therefore spend most of your time in active problem-solving, rather than reading.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites This course is directly related to [T232] or T235 which is a recommended prerequisite. It is desirable to have a grade 3 pass or better in [T232] or T235 before undertaking T331. It is also important to have a reasonable grounding in mathematics from M101, TM282 or a similar course. The fluid mechanics block, although self-contained in principle, will be more readily worked, and more value will be obtained from it, if you have studied T233, in particular Units 5-6 and 9-10.

Assessment (i) Four TMAs (35%); (ii) five CMAs (15%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes There are two television broadcasts. It would be advantageous if you could record the programmes for repeated viewing at appropriate points in the course. The programme material has been designed to be used in this way. There is also one audio cassette.

Calculator You must have a scientific-type calculator, including for example trigonometry functions (sine, cosine and tangent), logarithms and exponentials, and with exponential ('scientific') display.

Students with disabilities Course and supplementary materials are not available on tape.

T333 HEAT TRANSFER: PRINCIPLES AND APPLICATIONS

Third level: half credit

The course provides a thorough understanding of the principles of heat transfer and develops the skills required to carry out engineering analysis and design of thermal systems. It covers basic principles with the necessary mathematical background.

Throughout the course there is emphasis on the application of the subject, presenting many problems drawn from practical engineering situations. The scope and limits of various methods of heat transfer analysis are covered, developing skills appropriate to modern industrial practice. The main text consists of nine blocks. Most rely heavily on the two set books.

Content Block 1 introduces the three modes of heat transfer: conduction, convection and radiation. Its main aim is to enable you to identify the modes of heat transfer present in any thermal situation. The relationship between thermodynamics and heat transfer is covered, together with the application of the energy balance method of analysis.

Block 2 develops the principles of conduction heat transfer. It considers one-dimensional, two-dimensional and transient heat transfer problems, and different methods of solution.

Block 3 introduces the concepts of velocity and thermal boundary layers and convection transfer equations. It presents empirical

relationships in the form of dimensionless convection heat transfer correlations.

Block 4 presents the finite difference method of solving conduction heat transfer problems. It shows how this technique greatly helps analysis and makes it possible to tackle practical heat transfer problems which would otherwise be difficult or impossible. The accuracy of finite difference solutions is questioned.

Block 5 introduces the mechanisms of boiling heat transfer and condensation. It covers boiling curves and different forms of boiling (such as nucleate and convective) and of condensation (such as laminar film and dropwise).

Block 6 is about the fundamentals of radiation heat transfer, including black-body radiation; radiation from real materials; absorption, reflection and transmission of radiation; radiation exchange between surfaces. View factor charts and tables, shape factors and numerical methods of solutions are presented.

Block 7 develops work introduced earlier on combined heat transfer modes. It introduces heat transfer from extended surfaces, including fins of uniform and non-uniform cross-sectional area; fin performance; heat transfer enhancement.

Block 8 gives an introduction to practical industrial heat exchangers. Basic design procedures are considered in some detail, and shell-and-tube exchangers and others are described.

Block 9 leads you through a design study of a shell-and-tube heat exchanger in order to demonstrate a typical design procedure used in industry.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [T233]. If you got only a bare pass for [T233] you are likely to have difficulties with T333.

Complementary and related courses This course builds on [T233] and fits well in a mechanical engineering or thermofluids profile.

Assessment (i) Four TMAs (30%); (ii) four CMAs (20%); (iii) the examination (50%). Substitution can apply to one TMA and one CMA.

Students with disabilities The use of detailed charts, diagrams and lengthy equations in this course could be difficult if you have a visual or physical handicap.

Set books Frank P. Incropera and David P. De Witt (1990) *Introduction to Heat Transfer* (2nd edition), John Wiley, and *Thermodynamics and Transport Properties of Fluids* (SI Units) arranged by Rogers and Mayhew (2nd, 3rd or 4th edition), Basil Blackwell.

T334 ENVIRONMENTAL MONITORING AND CONTROL

Third level: half credit

T334 is the logical step from T234 *Environmental control and public health*, which lays the foundations in this subject area. T334 consolidates the T234 material and takes you on to the design/specification stage in selected areas of pollution control.

After working through the course you should be able to:

- Analyse environmental control problems and perform design calculations.
- Set performance specifications.
- Show an appreciation of the costs and benefits of selected environmental pollution control strategies.

Content The course is divided into four blocks (each equivalent to four units) to each of which is linked a TMA and/or a project. The course is presented in loose-leaf format with notes and explanatory texts associated with either published textbooks or journal reprints. Any books or journal reprints you need will be sent as part of the course. The course is designed for independent study and strong motivation is essential.

Block 1 Wastes management The two main types of waste are domestic and hazardous. For each there is a review of the nature, characteristics and quantities. Waste disposal techniques in both cases include transport, land-fill site selection and management, other

methods of disposal, leachate and gas control, water pollution protection and site after-use. In the case of domestic waste, recycling with special reference to energy recovery methods and their economics is an important topic. Trends in waste management are explored.

Block 2 Noise The introduction includes revision of basic concepts such as units, criteria and indices, legal and social control and planning. The technical aspect of noise control including prediction schemes and sound insulation of buildings are an important topic. There are case studies of public enquiries and of industrial noise.

Block 3 Water The two main topics are the theory and practice of:

- Water supply (demand estimation, quality treatment processes, design and economics) for domestic, industrial and agricultural applications.
- Effluent (sewage and trade) control, sewerage systems, design and economics.

Block 4 Air There is a revision of the nature and characteristics of air pollution. The selection, specification, design and economics of air pollution control processes are discussed. Other topics include automobile emissions, air pollution dispersion, modelling and chimney height calculations.

Because of the experimental nature of this course, the number of places may be limited.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites [PT272] or T234 are very strongly recommended. You must have access to T234 course materials and set books. From a revision point of view you will benefit from taking T234 as soon as possible after T234. A working knowledge of basic chemistry and mathematics is essential (TM282 could be useful).

Complementary and related courses T334 will allow coherent environmental management degree profiles to be followed. These can range from environmental engineering to a managerial approach to environmental monitoring. T334 is interdisciplinary and linked to food production systems and engineering courses in the Technology Faculty as well as to chemistry, biology and Earth sciences courses in the Science Faculty.

Prerequisites Five TMA equivalents (50%); there is a project worth two TMAs for which there is a threshold of 35% (choices are offered, one of which requires collection of home experimental data; for this project you can ask for a sound-level meter from the Home Kits Warehouse). The examination (50%). Substitution can apply to TMAs 01, 02 and 04 but not to the project TMA 05. TMA 03 is formative.

Students with disabilities Difficulties can be kept to a minimum if you choose a non-experimental project. Course and supplementary materials are not available on tape.

Cassettes Two audio cassettes.

Special feature You must have a scientific calculator.

T353

FAILURE OF STRESSED MATERIALS

Third level: half credit

When materials are put under stress in structures or machines they sometimes fail, with tragic and costly results. To forestall such failures, engineers should know all the ways in which load-bearing materials can fail. It is the aim of this course to reveal the principal modes of failure in stressed materials, and the conditions in which each mode may occur.

The course draws upon the complementary disciplines of mechanics and materials science, and it is designed for the student with some knowledge of both. From mechanics is drawn information about loadings and deflections in simple components, while from materials science comes information about the make-up and properties of real, constructional materials (watts and alloys). The course is particularly appropriate if you have an interest in mechanical, civil, chemical or materials engineering.

By considering a wide range of useful materials in a variety of loading conditions, the course shows how the occurrence of failure can be predicted. Such skills are applicable to the design of load-bearing artefacts and to the 'post-mortem' analysis of mechanical failures.

Content The modes of failure considered all involve either fracture or excessive change of dimensions. The main emphasis is on modes of slow and fast crack growth and, to describe these events, the theory of fracture mechanics is presented.

The course consists of a sequence of case studies, each of which presents a new mode of failure. Most are histories of failure investigations, the object of which is to discover the mode of failure and to recommend how a repetition of it can be avoided. For example, one case study considers the tragic failure of a colliery lift, leading to a diagnosis of the mode and cause of failure.

The other case studies involve design, and the object is to prescribe the dimensions of a product to meet given loading requirements without failure. For example, one case study considers how thick the walls of a polyethylene gas pipe must be in order to forestall failure by creep, creep rupture and environmental stress cracking.

The last unit is a project in which you are challenged to solve a problem. The nature of the problem changes from year to year but it is either a case of 'failure investigation' or of 'design'. No new skills are taught in this unit; it contains only the information required to solve the problem. Your solution is the subject of the last TMA, the result of which is used for assessment.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T351].

Recommended prerequisites This course assumes a certain amount of knowledge in mechanics such as is contained in [T232] or T235. The necessary knowledge of materials science is contained in T201 or T235 or T254. These courses are recommended prerequisites. However, we recognize that some students who have not taken these courses may have this assumed knowledge from their experience outside the Open University. For example, in mechanics you are expected to be conversant with: torsional and bending stresses, the plotting of shear force and the Mohr's circle construction for two-dimensional stresses; topics which are traditionally covered in many engineering courses. If you have not taken the two prerequisite courses you are strongly advised to send for either (or both) of two self-test papers, one on mechanics and the other on materials science. These papers contain advice on the feasibility of successfully completing T353 based on your test performance. They can be obtained by sending an A4 or A5 stamped addressed envelope to the T353 Course Coordinator/Manager, The Faculty of Technology, The Open University, Milton Keynes, MK7 6AA.

Complementary courses T292/(T291) is a complementary course. It deals with the use of transducers to obtain information (such as strain) from a structure. [T352] is also a complementary course. It examined industrial processing techniques used to manufacture artefacts, and since these techniques affect the microstructure and properties of the product, they may bear on the failure modes of the artefacts.

Assessment (i) TMAs (36%) - six shorter TMAs, two of which can be substituted; (ii) a project (14%) - a longer TMA that can not be substituted; (iii) the examination (50%).

Broadcasts The eight TV programmes are an important part of the course, used mainly to describe and demonstrate tests and techniques, the results of which are used within the case studies; knowledge of this may be assessed. Television is also used on location at industrial sites of particular relevance to the case studies.

Home kit In failure analysis great importance is attached to the visual examination of the failed component because this may reveal the probable mode of failure. The home experiment kit allows you to gain experience of visual examination. It contains plastic replicas of fracture surfaces which can be examined with a watchmaker's eyeglass (also part of the kit). It also includes stereo photographs of fracture surfaces at high magnifications. A polariscope/loading frame is provided so that stress distributions can be observed in photoelastic specimens. It is also used to measure the fracture toughness and the speed of propagation of cracks in a glassy thermoplastic. This kit may not be taken or sent outside the United Kingdom.

Students with disabilities This course is not recommended for visually handicapped students, nor for those with impaired manual dexterity. If you have any other disability please ask your tutor-counsellor for advice. Course and supplementary materials are not available on tape.

T362

DESIGN AND INNOVATION

Third level: half credit

This course is designed to help you understand

	Actor	Technology	Emphasis
Block 1	Individual inventor/entrepreneurs	Renewable energy (water turbines/solar cells)	Technical factors
Block 2	Business enterprises	Information technology (microcomputers/interactive videotex)	Market and commercial factors
Block 3	Nationalized industry	Transport (high speed trains)	Organizational factors
Block 4	Local and national government	GLEB Renewable energy	Political factors
Block 5	Global economic system	Economic cycles	Macro-economic interactions and trends

the processes of industrial innovation and product design so that you can engage more effectively in, or at the very least appreciate the nature of, innovation and design activities whether you are a designer, engineer, inventor, researcher, decision-maker or simply a consumer.

Although it originates from the Technology Faculty and is technology based, the course adopts a broad interdisciplinary approach in order to give you an understanding of the commercial, economic, social and organizational, as well as the technical, factors in successful innovation and good design.

The course has three main aims:

- To give you an insight into the technical and non-technical factors that influence the creation, development and adoption of new products, technologies and systems.
- To enable you to make critical assessments of product design and technical innovation projects from various points of view (e.g. business success, social benefit, environmental consequences).
- To enable you to apply what you have learned from the course to a project.

Content The course consists of three related 'streams' of study - theory, case studies and project work - linked by means of a series of study guides which contain the teaching/inter-grating material for the course. The reader forms the basis of the theory stream while the case study material is contained in a series of blocks, each concentrating on a particular source of innovation. The table summarizes the structure and content of the block case studies:

The project runs in parallel with the theory and case study streams and occupies at least one quarter of your total study time. You will be asked either to prepare your own new product development proposal or to develop a case history of an existing product which has passed through the various stages of the innovation process.

To help you with your project you will learn about communicating technical ideas through drawing and modelling; protecting ideas through patents; identifying demand through market research; assessing the potential social and environmental effects of innovations; presenting and promoting innovative ideas and managing the innovation process.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites There are no formal prerequisites for this course, and you will not require any special technical or mathematical knowledge.

Complementary and related courses These include [T263], T264, T244, T247, T301, [T392], [D208], DT200, [A281] and A282. The experience gained from project work in T362 would be good preparation for T401.

Assessment (i) TMAs 01-03, which assess understanding of the course material and also contain a project element (30%); (ii) TMA 04, the project report (20%); (iii) the examination (50%). Substitution can apply to one TMA in (i) but not to the project report.

Broadcasts and cassettes Eight TV programmes are used to illustrate the various stages of the innovation process, taking you 'behind the scenes' into the places and organizations where new products are devised and developed. You will be expected to make use of this material in your assignments.

There are eight audio cassette programmes which serve two general purposes: skills teaching and tutorial advice on tackling the project, and interviews with individuals involved with particular aspects of design and innovation.

Residential school The one-week course-based summer school will give you support for your project work and an opportunity to do practical work in a variety of areas including creativity and invention, product analysis, microcomputers in design, marketing and technology policy.

Students with disabilities The project work could

require visits outside the home, e.g. to libraries or firms. Course and supplementary materials are not available on tape.

Set books R. Roy and D. Wield (eds.) *Product Design and Technological Innovation*, Open University Press (course reader).

T363

COMPUTER-AIDED DESIGN

Third level: half credit

This course provides an introduction to and develops an awareness of the principles of computer-aided design (CAD) and to a range of applications of CAD systems in design.

The aims of the course are:

- To teach some of the principles of computer-aided design and computer graphics.
- To provide some practice in the application of those principles in design exercises.
- To illustrate the application of those principles in professional CAD packages used in engineering, electronics and building design.

Content The course is presented in three parallel (but interdependent) streams. Each stream uses a different teaching medium.

• **Text** The text stream begins with an introduction to design and computers (Units 1 and 2) and ends with new directions in CAD (Unit 15) and implications of CAD (Unit 16). All the text between Units 2 and 15 is in the textbook *Principles of Computer-aided Design*. This deals with the ways in which various tasks and procedures in design can be formalized, how geometrical and other properties of designed objects can be represented, and the significance of computer aids for the theory and practice of design. This material is broadly divided into conceptual and mathematical foundations, modelling, analysis and synthesis. Study notes with self-assessment questions are provided for all the required chapters from the textbook.

• **Computer** The computer stream consists of structured exercises, mainly concerned with CAD applications. The application areas chosen are in architecture, electronics and mechanical engineering design. Most of the exercises are based upon original teaching software developed at the Open University for this course. However, some exercises do provide access to commercial CAD software for modelling and draughting. Each computer exercise has its own study notes with self-assessment questions.

• **Video** The video stream helps to teach some of the basic principles and demonstrates professional CAD systems in areas such as draughting, modelling analysis and graphics. Accompanying study notes provide exercises, comments and self-assessment questions.

These three parallel streams run throughout the course. You are expected to integrate the material across the boundaries of the different media streams. For example, a typical study period might include chapters from the textbook on representation and graphical techniques, computer exercises on architectural plan layout and video study on basic graphics principles and draughting systems.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites Because of the design orientation of this course [T263] is recommended as a prerequisite. However, T363 does not assume any special familiarity either with the design process or with computers. It is written for students with a wide variety of backgrounds. Some experience in reading mathematical notation, particularly the mathematics of matrices and solid geometry, will be an advantage.

Assessment There are four TMAs. TMA 01 is weighted 8% and TMAs 02-04 are weighted 14% each. Continuous assessment counts 50%; substitution of one TMA is allowed. The examination counts 50%. The examination and the continuous assessment may draw upon all course components (units, course textbooks, video and computer exercises). Certain assignment questions may require you to deliver answers on disk.

Cassettes The five sixty-minute returnable video cassettes are an important part of the course, so you must have easy use of VHS video playback facilities. Each video has its own study notes with self-assessment questions.

Computing You will need a computer for the CAD exercises which are an essential part of the course; you will be using it for about 60 or 70 hours throughout the study year. You can either borrow a computer from the University or arrange your own access to one.

• Loan by the University
For this course only, the University lends a Research Machines Nimbus computer with colour monitor and mouse to students on the usual home kit terms. Those who have been in the University longest will be allocated a machine first. The Undergraduate Student Office will let you know if you are not likely to get a machine on loan.

• Making your own arrangements

There is no limit to the number of places on the course for students who arrange their own access to a suitable microcomputer. This must be an IBM PC, PC/AT (including 386 version), PS/2 or compatible microcomputer running MS-DOS version 2.1 or higher, with at least 640K RAM memory, at least one disk drive capable of reading and writing 360K 5.25" disks or 720K 3.5" disks and an EGA or VGA graphics card (or compatible) capable of displaying sixteen colours at 640 x 350 graphics resolution. (Some EGA cards will require a Graphics Memory Expansion option to achieve this.) You will also need a colour monitor compatible with the graphics card and a two- or three-button mouse with driver software (usually MOUSE.COM or MOUSE.SYS) which is Microsoft mouse-driver compatible. A printer is not required. It is your responsibility to satisfy yourself that your own arrangements are adequate. A test disk is available on request.

Students with disabilities Course and supplementary materials are not available on tape.

Set books J. Rooney and P. Steadman (1987) *Principles of Computer Aided Design*, Pitman.

T393

ELECTRONIC MATERIALS AND DEVICES

Third level: Half credit

Although electronic components are exploited to undertake a wide range of tasks, there is often little understanding of why the black boxes used in electronics display the characteristics they do. To get to the heart of this understanding, it is necessary to have a well-founded multidisciplinary background in physics, materials science and electronics. The aim of this course is to show how these three strands interact in the modelling, manufacture and operation of some modern electronic devices. Since the concepts behind the electronics revolution are extremely complex and constantly changing, the course sets out to provide not exhaustive or wide-ranging knowledge but an understanding of the main factors that govern the behaviour of some individual devices in terms of both the underlying physics of materials and the need to deal with real materials.

Content

Block 1 Resistors, resistivity and wafers (Units 1-4) covers the basic physics of electrical conduction in solids, particularly in semiconductors. Its end point is the characterization of single-crystal wafers, which are the basis for many manufactured devices.

Block 2 Semiconductor junctions (Units 5-8) An explanation of the behaviour and simple mathematics of the p-n junction is followed by a discussion of the fabrication and properties of diodes. There is a short case study of the design and manufacture of a commercial power diode.

Block 3 Optoelectronics (Units 9-10) How p-n junctions can be used for the emission or detection of light is illustrated by reference to the development of a high-performance optical-fibre transmission system for the telephone trunk network.

Block 4 Bipolar devices and integration (Units 11-13) The operating principles of bipolar transistors are explained. The design principles and manufacturing processes of a commercial

transistor and a common operational amplifier are outlined.

Block 5 Field-effect devices and VLSI (Units 14-15) The mode of operation of field effect transistors is explained, but the emphasis in this block is on how enormous numbers of elements can be combined to form 'very large scale integration'.

Block 6 New technologies (Unit 16) uses three important new topics to tie together and revise many of the scientific and technological principles developed in the previous blocks. The three topics are: amorphous semiconductors; heterojunctions and superlattice structures; gallium arsenide integration.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites The course covers aspects of electronics, physics, mathematics and materials science, and ideally you should have some general background in each of these subjects. The minimum requirements are listed below, but you will find the course much easier if you have gone further in at least one area.

Electronics An elementary knowledge of the use of diodes, transistors, operational amplifiers, logic gates and memories in electronic circuitry. [T283] or T202 is recommended.

Mathematics The main topics required are: differentiation and integration, trigonometry, logarithms and exponentials. Although these are the essential topics, it is a considerable advantage if you have studied further and have a wide experience of applying maths to physical situations. A good pass in TM282/TM281 represents the minimum mathematical background, but it is better to have taken an additional course such as MST204.

Physics Elementary mechanics, waves, geometric optics and basic classical atomic physics are assumed to be known. Elementary quantum mechanical principles are introduced in the course, and it is an advantage if you have some previous knowledge of these. S102 or T281 cover the minimum requirements; S271 would be excellent preparation.

Materials science Only a slight knowledge of materials science is assumed, and all the necessary topics are taught within the course. T253 contains valuable background.

T393 is a demanding course and you are advised not to take it as your first at third level. You should take careful note of the recommended prerequisite knowledge, and be prepared to tackle conceptually difficult models and ideas which are more in line with a physics way of thinking than an electronics one.

Assessment Four TMAs (50%) and the examination (50%). Substitution can apply to one TMA. There are also six formative CMAs which revise concepts and test the understanding of each part of the course before proceeding further.

Cassettes A two-hour video cassette will be supplied, on loan, which contains teaching material that is assessable and not repeated in print. It is recommended that you have easy access to a VHS video cassette player. There are also three audio cassettes.

Students with disabilities If you have a severe visual handicap you may well find that the intricate nature of many of the diagrams and the use of video cause difficulties. Course and supplementary materials are not available on tape.

Set book The set book is part of the course's assessed material. The course guide in the first course mailing will give you details about it.

T394

CONTROL ENGINEERING

Third level: half credit

Control theory is used to analyse and design systems that are controlled or are to be controlled. The term 'system' can apply in its broadest sense; control theories have been used in the analysis of sociological, biological and economic systems. However, this course concentrates on the application of control theories, and existing engineering systems have therefore been used to illustrate the theories. Home experimental work is also provided for this purpose. The three main case studies are of a control system in a power station, the control of a satellite tracking antenna, and a digital-position controlled system for an industrial robot.

Content The course starts by explaining alternative fundamental control strategies. Two of the case studies are introduced: a power station and a satellite tracking station.

Next it is shown how physical laws can be used to produce models of systems in the form of differential equations and how these models can predict the behaviour of a controlled system.

The case study systems are examined in more detail to show how this was done in practice. Models derived from experimental results are considered and the stability of control systems explored.

s-transform techniques are introduced, followed by aspects of root locus. Controllers, compensators and disturbances are then considered.

The third case study is then introduced to illustrate methods of modelling suited to the use of digital computers, including the use of z-transform. The advantages of using digital computers to solve control problems and the effects of using sampled data are discussed, as are techniques for designing digital control systems.

You then carry out a project, using the home kit, to design a control system to meet given requirements. Three units' worth of work are allocated to this project.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination [T391].

Recommended prerequisites T292, or [T232]/T235, or [T283]/T202 and TM282, or MST204. No knowledge of control theory or practice is assumed and any mathematical topics used to support the material that are not in the recommended prerequisite courses are taught as part of the course. The course assumes familiarity with and the ability to manipulate the form of solution of first- and second-order differential equations, a knowledge of Newton's Laws of Motion, an understanding of electricity and terms such as current, voltage, resistance, capacitance, and an elementary understanding of binary numbers.

Complementary and related courses T394 is considered to be an integral part of a degree profile in engineering mechanics or electronics. It can also form part of a degree profile in systems, computing and computers, engineering science or technological systems.

Assessment (i) Three TMAs (20%); (ii) project report (10%); (iii) four CMAs (20%); (iv) the examination (50%). Substitution will be allowed for one CMA and one TMA in (i) but not for the project. There is also one formative CMA at the beginning of the course.

Cassettes There is one audio cassette and units and assessment will assume that you have access to an audio cassette player.

Home kit This includes a chart recorder and a mini-makes use of a microcomputer. The kit, which is an important part of the course, may not be taken or sent outside the United Kingdom. You will need a television set for use with the kit.

Students with disabilities If you have a severe visual handicap you will find it difficult to cope with the many and sometimes complex figures in texts, and to gain much from the kit. If you have impaired manual dexterity you may have difficulty in using the kit and drawing the several types of graph. Course and supplementary materials are not available on tape.

Preparatory reading You may find it helpful to look at [T291] Units 8/9/10 or T292 Block 4, which deal with second-order systems.

T401

TECHNOLOGY PROJECT

Fourth level: full credit

Only limited numbers can be accepted for T401. Please pay particular attention to the section on Conditional Registration below and be prepared to plan well in advance of your application.

The technology project offers you the opportunity of gaining a credit through carrying out a supervised project in any area or combination of areas covered by the Technology Faculty. Projects have been successfully introduced in a number of OU courses, but in T401 you work solely on one project chosen to reflect your own interests.

The aims of the course are to give you an opportunity to:

- Use the knowledge you have gained and skills you have developed in other technology courses.
- Study independently and develop the ability to organize yourself and your work in order to achieve a specified goal within a strict time limit.

Types of project The projects in T401 usually have a practical aim in view. They may result in design proposals or specifications for a system or artefact, in policy proposals, or in studies relevant to such practical ends. It is not expected, however, that T401 projects should

be research projects with pursuit of knowledge as the main aim, in the way that postgraduate research for a higher degree would be.

The breadth of subjects covered in completed projects is very wide and spans the academic discipline interests of the faculty. These include electronics, materials, engineering mechanics, design and systems. It should be emphasized that several kinds of activity can form the basis of a suitable project, whether it is concerned with an investigation of an organization or system or a design specification for a mechanical or electrical component. The important element in all projects is that you are looking at a particular problem using the knowledge gained from previous technology courses coupled with your own experience and suggesting how the problem can be tackled. In other words, the project is an exercise in creative skills. It is no accident that the term 'design' is frequently used in project proposals.

No single subject or discipline has a monopoly of the type of T401 project that can be done, and there are no imposed academic prerequisites such as a guided course of study unless these are felt to be in your best interest. As long as the project is academically acceptable, the only constraints are practical ones such as, is there a suitable local tutor? Are expensive laboratory facilities required (which cannot be provided through the co-operation of your employer or tutor)? Is there a suitable internal examiner?

Choosing a project There are two ways of doing this. Usually, you suggest your own project topic or area. If you have no topic in mind, you should consult the technology staff tutor at your Regional Centre or the T401 course manager at Walton Hall; it may be possible to offer suggestions for a project based on areas of interest to you. Either way, the project proposal is then developed, in consultation with a prospective tutor, into a feasible project proposal to be forwarded to the course team for approval.

All project proposals must have a technological content and must lie within the field of topics covered by the Faculty of Technology. They must also be consistent with honours degree work at fourth level. In practice these stipulations have not proved to be too inhibiting, although it may not be possible to proceed to a formal project proposal if your academic background is judged to be inappropriate for the subject.

In order to get the most out of doing the project, it must be compatible with your previous studies or experience. If a proposal does not show this compatibility it is unlikely that a suitable tutor or internal examiner will be found.

If you wish to use T401 as part of a submission to the Engineering Council for professional recognition and status as a chartered engineer you are advised to ask for a copy of Recognition Information Leaflet 3.3 (see Section 1) and seek additional advice from the relevant engineering institution.

NOTES FOR PROSPECTIVE STUDENTS

Level and prerequisites Before conditionally registering for T401 you must already have obtained credits entitling you to the award of the BA degree, but must not have exceeded the honours credit maximum or be put into a position to do so by taking T401.

The recommended prerequisite for T401 is at least two credits in courses supervised by the Faculty of Technology. In order to obtain the maximum benefit from the technology project, you are strongly advised to take at least one third-level technology course during the year in which you are registering for T401 (that is, in the year before doing a project). For systems projects this would be T301.

T401 is designed to be the culminating point of your OU studies. This and the demanding nature of the course means that it is not appropriate to undertake another course concurrently with T401.

All T401 projects are at fourth level. This has a number of implications:

- The degree of independence and initiative expected of you will be consistent with a course taken at fourth level in an honours degree programme.
- Projects will be expected to use knowledge and skills gained in other technology courses (or from previous educational or work experience), including courses at third level.
- You may be advised to pursue a specified course of study before starting a T401 project. This may happen if it is considered that you are inadequately prepared to embark on the proposed topic to the depth and breadth consistent with a fourth-level honours degree project.

Conditional registration There are only about 100 places on this course. Students will be selected according to the academic acceptability and feasibility of their project proposals. If there are more acceptable proposals than places, those who have been in the University longest will be offered places first.

Application for T401 takes place from 1 January to 31 March in the year before study. If you wish to be

considered for T401 (for 1993) you should write, during this period, to the Undergraduate Student Office, The Open University, PO Box 72, Milton Keynes MK7 6AQ asking for an application form, which you must complete and return to the T401 course manager before 31 March 1992. In May 1992 you must also conditionally register for T401, and you are advised to give alternative choices in case your application is not successful. Please remember to return your conditional registration form to the Undergraduate Student Office, not to the Faculty. At this stage your project proposal need only be in outline form, as a tutor will be appointed to help you produce a formal proposal. This appointment is not a guarantee of acceptance; your project must meet the criteria explained in 'Choosing a project'.

Tuition You will have a personal tutor, who will already have helped in preparing your formal proposal. You will hear by October whether your proposal has been accepted, so that you can meet your tutor in November for your first project tutorial. We have planned for each student to have at least ten hours of tutorial time during the year.

About £20 is available for each project to pay for essential items, including library searches.

Assessment There are no conventional TMAs or CMAs but you will be required to present three reports during the year:

1 An initial report investigating the project background and giving a critical appraisal of the literature, defining the project proposal and setting out a detailed project plan (submitted in February).

2 An interim report outlining progress made, elaborating on the project plan, and including a draft chapter on the methods of investigation used as well as chapter headings for the final report (submitted in June).

3 A final written report submitted in September.

The final project report will be assessed by both your tutor and the internal examiner (a full-time member of the Open University's academic staff). You will meet the examiners at a compulsory oral examination. Oral examinations are held in October, usually in your Regional Centre.

Resits and repeats You will not normally be allowed to:

- Resubmit a final report or have another oral examination (i.e. resit T401) if you fail to obtain a credit.

- Attempt the same project topic in a subsequent year if you withdraw before completing the course. If exceptional circumstances arise each case will be considered individually, but you should not include T401 as a repeat or resit option on your conditional registration form.

Course materials There are no course units but you must read the *Open University Study Guidelines* and an *Information Search Guide* to help you in the conduct of your project and in writing your project reports.

Residential school You may be advised by your tutor to attend a technology course residential school if its academic facilities are relevant to your project.

Students with disabilities Because of the wide range of projects and the emphasis on individual choice, you should have no particular problems with T401 if you have been able to take third-level technology courses. Course and supplementary materials are not available on tape.

Set books There are no set books for T401, but you may need to buy books for your own project.

TM282 MODELLING WITH MATHEMATICS: AN INTRODUCTION

Second level: half credit

Modelling with mathematics is a process by which a problem is simplified so that it can be expressed in mathematical terms: a solution can then be obtained using mathematical techniques and interpreted in the light of the simplifications made. TM282 is an introductory course about

this process. It is designed for students who, while not wishing to pursue the full range of mathematical ideas covered in M101, nevertheless need a basic understanding of some mathematical methods, and of how to apply them, for other post-foundation courses in technology or science. The course teaches a number of mathematical skills and illustrates their use in a modelling context. It also teaches the process of formulation of models and the interpretation of the solutions.

The aims of the course are:

- To explain the process of mathematical modelling.
- To introduce a number of standard mathematical models.
- To teach some of the mathematical skills, including calculus, needed in the handling of mathematical models and in higher level technology courses.

Content Units 1 and 2 introduce the 'modelling cycle' and show how it can be applied to systems resulting in both linear and non-linear models. Units 3 and 4 tackle basic ideas in trigonometry and the use and manipulation of vectors. Units 5 to 8 cover methods of differential calculus. They show how dynamic systems, populations and economic situations can be modelled using differentiation to handle rates of change. Units 9 to 12 cover methods of integration, discussing applications including areas and volumes. Part of Unit 11 and Units 13 to 15 are on the important topic of differential equations which occur in many models in science and technology. Unit 16 is a revision unit in which many of the topics in the course are brought together and used in a case study on modelling heat flows.

Though a lot of study time is necessarily devoted to acquiring mathematical skills, there is throughout the course an emphasis on the modelling process itself, which is as intellectually demanding as the mathematical techniques. A booklet of modelling themes is provided which discusses some general ideas in which mathematical modelling is useful, e.g. population modelling and financial modelling, and reference is made to these themes at various points in the course units.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combinations [M100]/M101; [MST281]/[MST283]/4; MST204; [TM281]. Please read the *Advice to Science and Technology Students* in the *Mathematics Overview*.

Recommended prerequisites You are expected to be familiar with basic mathematical ideas which are taught in both [T101]/[T102] and [S101]/[S102]. If you have not taken one of these courses, you can still take TM282 if you have a basic knowledge of arithmetic, elementary algebra and some geometry and trigonometry. A diagnostic quiz will be sent to you before the course begins to help you to decide whether your present level of mathematics is sufficient. For those who feel that they need to brush up their elementary mathematics we recommend *Countdown to Mathematics* by Graham and Sargent (Addison-Wesley) Volumes 1 and 2.

Related courses TM282 is a useful introduction to the mathematics needed in several second-level technology and science courses such as T202, T235, [T252], T292. It should not, however, be regarded as a substitute for M101 if you intend to take further mathematics courses. A good pass in TM282 is a sufficient prerequisite for MST204, which is a course strongly recommended if you wish to follow more mathematical technology and science courses (e.g. T331, T394).

Assessment (i) Seven TMAs (30%), each 1/3 of a standard TMA in length; (ii) five CMAs (20%); (iii) the examination (50%). Substitution can apply to up to two TMAs and one CMA.

Broadcasts and cassettes Eight TV programmes closely integrated with the written material. The aim is to reinforce the modelling aspect of the course, and to use animation techniques to illustrate the mathematical ideas involved in the models introduced. Detailed broadcast notes work through all the mathematical

manipulation so that you can become familiar with this before watching and revise it afterwards.

Audio cassettes are also an integral part of the course. They are used to teach many of the mathematical skills in the course.

Residential school A one-week course-based summer school giving you considerable practice in both mathematical techniques and mathematical modelling of real problems. Lectures followed by example sessions, modelling projects and an extensive tutorial programme make up most of the week. A mock exam is provided to give you practice in answering questions under examination conditions. You are not assessed on your work at the school.

Students with disabilities Like many mathematical courses which use a lot of diagrams, the course may be very difficult if you have a visual disability.

Calculator You will need a hand-held battery-operated calculator. No particular calculator is recommended but it must perform the operations of $+$, $-$, \times and \div to six-figure accuracy and have the following keys: $\sqrt{\quad}$, x^2 , \sqrt{x} , π , y^x , and brackets. You will need the sine, cosine and tangent functions and their inverses (in both degrees and radians) together with logarithms to the base ten and natural logarithms with their inverses 10^x and e^x . A memory function is very useful. Calculators which can plot graphs on their displays will not be permitted in the TM282 exam so you are advised not to buy this type of calculator.

TM361 GRAPHS, NETWORKS AND DESIGN

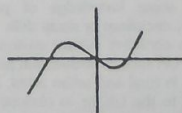
Third level: half credit

What type of code was used by Mariner 9 in communicating with Earth? Where do you brace a framework to make it rigid? How many colours are needed to colour a map so that neighbouring countries are differently coloured? Can you tile a floor with twelve-, six- and four-sided shapes? How can you assign people to jobs for which they are qualified? How can a manufacturer send his product from his factories to a number of warehouses so that the total transport cost is a minimum?

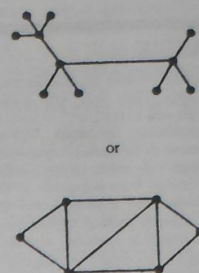
These are some of the many questions which will be answered in this problem-based course. The problems studied range widely from real ones arising in present-day technology, operational research and the physical and social sciences, to puzzles of a more recreational nature. Throughout the course we try to show the connection between seemingly different problems in widely different areas, and to describe common methods for their solution.

This interfaculty course is intended for a wide audience and should appeal to students with a variety of backgrounds (see Prerequisites below). Those who are more mathematically inclined will see how their mathematics can be used to solve real problems, whereas students with a technological background will come to appreciate the use of a mathematical framework to relate different ideas.

Content The material is presented in a down-to-earth manner, with an emphasis on solving problems and applying algorithms rather than on abstract ideas and formal proofs. Throughout the course considerable emphasis is given to the modelling of problems using mathematical ideas, and the representation of these ideas by means of diagrams. In this context, note that the word *graphs* in the course title does not refer to a picture like this:



but to a diagram consisting of points joined by lines, like this:



These points correspond to chemical atoms, towns on a map, electrical terminals, or anything else that can be connected in pairs.

Some areas covered are:

Operational research Job assignments, bottlenecks, activity networks in project planning, scheduling, design of experiments.

Transport planning and traffic control Flows in networks, choice of optimum route, minimizing dangerous crossings at traffic intersections.

Communications Synthesis of telecommunications networks, designs of codes so as to reduce errors in communication.

Structures and mechanisms Degrees of freedom in a structural system, synthesis of mechanisms, tracing a frame structure.

Electrical and related networks Analysis of RCL networks, Kirchhoff's laws, multipoint networks and systems.

The main areas of mathematical interest are:

Linear graphs and diagrams Trees, Eulerian and Hamiltonian graphs, shortest path problems and critical path analysis, planar graphs and maps, the four-colour map problem.

Network flows Flows in capacitated networks, max-flow min-cut theorem, transversal theory, assignment problems.

Enumeration Binomial theorem, various methods of counting including the use of generating functions, recurrence relations and the inclusion-exclusion principle.

Block designs Design of experiments, coding theory, triple systems and the 'schoolgirls problem'.

Geometry Tessellations, polyhedra, polyominoes and tilings.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites The recommended prerequisites have been kept as broad as possible. The course should be equally accessible to students who have previously taken mathematics courses and those who have taken courses in technology or science, since the main prerequisite is 'experience'. However, it is strongly recommended that you should have had some experience in mathematics (as given by, for example, M101, [MST283], MST284, TM282, or an A level course) and the equivalent of a full credit at second level in mathematics and/or technology and/or science. Whatever your previous courses you should find plenty to interest you, as long as you are willing to go along with the interdisciplinary nature of the course.

Assessment Four TMAs and six CMAs (50%) and the examination (50%). Substitution can apply to one TMA and one CMA.

Broadcasts and cassettes Sixteen TV programmes. Four audio cassettes covering thirteen units.

Students with disabilities The text could cause difficulty if you have impaired sight, since there is a large number of diagrams. Substantial use of audio cassettes could cause problems if you have impaired hearing.

OVERVIEW

'U' or 'University' courses are interdisciplinary or multidisciplinary. They deal with subjects of broad and general interest and include a wide range of contributory disciplines. This enables common themes or topics to be examined from various points of view, using skills and knowledge derived from a number of different academic areas, both arts-based and science-based. The subjects tackled by U-courses are often related closely to everyday experience.

All four of the U-courses are full credits: all are at second level. They have no prerequisites (other than a pass in any foundation course), and they do not assume knowledge of any one discipline. Indeed, they are specially designed to interest students with widely different experiences and academic interests and to fit into a variety of degree profiles. If you wish to follow broadly based courses, U-courses will appeal as interesting areas of study in their own right. If you have already completed specialist courses, U-courses may give you new perspectives on your previous studies or help to place them in a wider context. If you have already completed a foundation course, on the other hand, U-courses may offer the opportunity of gaining some understanding of unfamiliar disciplines before deciding what further courses to take at the post-foundation level. Although U-courses are not designed as part of any particular academic programme, they could have a place in a number of coherent degree profiles. These are outlined in Table II.

When reading the following course descriptions do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

U205

HEALTH AND DISEASE

Second level: full credit

The course should appeal to anyone who has a broad interest in some of the important contemporary issues in the UK and the rest of the world. It draws on current research in social sciences, medicine, history and biology and fosters a critical awareness of the many different approaches to health matters, from the personal, subjective experience of being ill, to the biological and medical view of illness and the economic and political aspects of health and disease.

Content The course is presented in eight books, each centred on a particular area of study. The books vary in length from three to six weeks of work.

Book I *Studying health and disease* introduces research methods in medicine, biology and the social sciences. You will not be expected to become a competent user of these methods, but you should be able to understand their scope and limits. Topics include clinical diagnosis, basic methods in demography and epidemiology, surveys, clinical trials and experimental design.

Book II *Medical knowledge: doubt and certainty* traces the development of scientific medicine since the sixteenth century and questions the supremacy of medical knowledge through three case studies — plague, hysterectomy and hysteria — which illustrate the effect of society on health and, conversely, the effect of disease on society.

Book III *The health of nations* describes the predominant patterns of health and disease around the world both now and in the past, looking at geographical differences as well as ethnic, gender and class variation. It then examines patterns of mortality and morbidity in the United Kingdom and how these might be explained in terms of social and economic structures.

Book IV *The biology of health and disease* describes the chemistry of living cells and progresses to human anatomy and physiology. No knowledge of biology is assumed, and basic terminology and concepts are introduced carefully. The second part discusses biological aspects of disease: genetic disorders, degeneration, infections and trauma and psychological concomitants of disease.

Book V *Birth to old age: health in transition* traces factors affecting health from birth to old age, with emphasis on the transitional points such as birth, puberty, the menopause, and death. The book points out the interaction of social, economic, biological and personal history factors in shaping the health of different age groups.

Book VI *Experiencing and explaining disease* relates the subjective experience of disease to the biological and social explanations that have been offered for it, using case studies — a 'minor' disorder: headache; an acute emergency: appendicitis; a serious 'physical' disease of contemporary industrialized countries: cancer; psychiatric disorder and addiction, particularly to opiates.

Book VII *Caring for health: history and diversity* considers the development of services, institutions and occupations within health care and wider public policies relevant to health; an international comparison of contemporary health care systems; and the role of the state in the provision of health care. The relationship between formal and lay health care is considered, particularly the role of women as health care providers.

Book VIII *Caring for health: dilemmas and prospects* considers the organization and management of the NHS; decision-making at national, local and individual levels; how innovation and change come about; and how they must be evaluated. The focus then widens from health care to public policy and strategies for prevention. Coronary heart disease and AIDS are a point of discussion. The course ends with speculation about the future.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses U205 complements many other courses in the undergraduate programme and it would be misleading to single out any in particular. The Tables of Related Courses indicate appropriate course combinations with U205, ranging from biology to economics, the history of ideas, social studies and statistics.

Assessment Seven TMAs (50%) and the examination (50%). Substitution can apply to up to two TMAs.

Broadcasts and cassettes Eleven TV programmes and eight hours of audio cassettes. The TV programmes are an important part of this course, and about half the audio cassette time is spent on further analysis and discussion of them.

Set books A specially prepared reader is an essential part of the course: N. Black, D. Boswell, A. Gray, S. Murphy and J. Popay (eds.) *Health and Disease: a Reader*, Open University Press.

U206

ENVIRONMENT

Second level: full credit

U206 is an inter-faculty course which introduces basic concepts, processes and problems relating to environment. It spans scientific, technological, social scientific and philosophical approaches. Students may enter the course after any of the five foundation courses, so we make minimal assumptions about knowledge of particular content areas, disciplines or study skills.

The course considers current environmental matters in the UK such as nuclear dumping, acid rain, changes in rural and urban areas. But it is not confined to the UK or to obvious issues: one of our aims is to widen awareness of environmental concerns by identifying less obvious problems in the UK and problems in other parts of the world and at other times. Much emphasis is put on *analysis* of the causes and ramifications of problems and the complex interactions between ecological, chemical, and other natural processes and economic and political processes. You are encouraged to evaluate the advantages and disadvantages of proposals to ameliorate or solve environmental problems.

Content The course is designed to show both the variety and the interconnections of the environment and is presented in four books. It ranges over a variety of environmental issues at different times and in different places, and stresses the relationship between the local and

the global, the natural and the social and the individual and society. In this way you will be able to relate your own experience and local environment to the wider context.

Book 1 *Environment and society* First a case study of Cumbria is used to illustrate the environmental issues to be considered by the course and to show the need for a deeper understanding of natural and social processes. The next three chapters analyse the evolution of the biosphere, as physical processes and living things interacted over geological time, the variety of ecosystems which resulted and the cycling of water and minerals. Human societies have had considerable effects on the environment over many centuries, and modern technology is rapidly increasing them. Finally, it is shown that societies have had a variety of attitudes to the environment in the past and that self-consciously environmentalist positions are relatively recent.

Book 2 *Environment, population and development* The introductory chapter analyses human population growth and economic development as a prelude to consideration of rural and urban environments in First and Third Worlds. The next three chapters consider agricultural systems in terms of sustainability and productivity, with more detailed consideration of temperate agribusiness and tropical systems, especially paddy rice. Then agriculture is related to other uses of the British countryside. The last two chapters analyse the environmental problems of First- and Third-World cities.

Book 3 *Energy resources and environment* analyses supply and demand for energy and mineral resources, ranging from availability of resources, methods of extraction and consequences of processing to consideration of alternative methods including mineral recycling and renewable energy technologies. The development of state regulation related to the changing chemical industry is also covered. Finally environmental politics is discussed in relation to nuclear waste.

Book 4 *Global environmental issues* tackles the really big issues of today and tomorrow — the atmosphere and climatic change (including the ozone hole and greenhouse effect), the oceans and global development — considering views about how societies need to change their priorities if they are to reduce damage to environments. The second half of the book is about international responses, particularly the concept of sustainable development.

The project A small project is an essential part of the teaching strategy: it is introduced early in the course and developed in parallel with the course texts and assignments. Five study weeks have been allocated for work on the project.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses [D202], [D205], [D208], [S236], [S238], [S330], [S326], [T234], [T241], [T274], [T334], [U204].

Assessment (i) Eight TMAs (50%); (ii) the examination (50%).

Broadcasts and cassettes Eight TV programmes present case studies from different countries, and two audio cassettes work through some basic skills of literacy, numeracy and scientific terminology.

Students with disabilities Course and supplementary materials are to be recorded for 1992.

U207

ISSUES IN WOMEN'S STUDIES

Second level: full credit

This is an interdisciplinary course introducing the principal theoretical debates in women's studies and showing its development as a coherent field of enquiry. The course will be of interest to students from all faculties and does not assume any particular previous knowledge.

How are the categories of women and men distinguished? Is there anything distinctive about women's experience? How do differences based on gender relate to differences based on class, race, age, culture and religion? Drawing on different disciplines, U207 explores these questions in relation to evidence about women's

experience, their social and economic position, how they have influenced and been influenced by science and technology, and cultural representation both of and by women. Attention to contemporary Britain is balanced by examples from other times and other cultures. The course is presented in four readers with supporting study guide material.

Content

The *Introduction* outlines the aims of the course by exploring the relationship between women's experience and women's studies. It examines interviews with several women of similar age whose life experiences are very different and uses the evidence of these accounts to introduce the role and value of theory in making sense of experience. Changes in women's lives over the past twenty years are considered in relation to developments within the women's movement which have moved from an initial concern with gender inequalities and women's experience to a broader view which takes account of differences of class, ethnicity, culture and age between women.

Book 1 *Knowing women: feminism and knowledge* provides much of the theoretical material which underpins the course and is studied in three sections dispersed through the study year. It presents and analyses material which has been influential in the development of feminist theory and contributed to the process through which women have come to know about themselves. The book begins by developing the questions raised in the *Introduction* to do with differences in women's experience. It continues by considering the historical and cultural association between women and notions of nature and 'the natural' and the connections between biological and sociological explanations of sexual difference. This leads to an explanation of ideas about subjectivity, sexuality and identity through an analysis of arguments based on psychoanalysis and language. The last section, studied at the end of the course, reviews theories and considers the status of theory itself from the point of view of a feminist *epistemology of knowledge*. **Book 2** *Defining women: social institutions and gender divisions* analyses the social, economic and political position of women in contemporary societies. It considers in detail the changing position of women in the labour market, the family, motherhood, the welfare state and women's legal position. These areas are explored through dichotomies and concepts which are central to an understanding of women's studies, such as public/private, equality/difference, dependence/independence, caring, citizenship and power. The book also examines the relationships between changes in socio-economic conditions, the development of feminist perspectives and the political practice of the women's movement and, although we are looking mainly at Great Britain, material from non-British societies and earlier periods is used to challenge the assumptions that are common to British scholarship, everyday behaviour and state policies and practice.

Book 3 *Inventing women: science, technology and gender* examines how the areas of knowledge and expertise called 'science' and 'technology' have contributed to the construction of a gendered social world, and to definitions of 'woman' and 'female'. The book concentrates on areas including sex, gender and reproduction; the technological construction of domestic lives; science and technology in the worlds of work, education and training. The last section reviews notions of a feminist science and technology by considering women in relation to military technology, the application to technology in developing countries and its effect on women.

Book 4 *Imagining women: cultural representations and gender* examines the representation of images both of and by women through various forms of cultural practice in different parts of the world. It analyses both the ways in which women have been traditionally represented (and why), and ways in which women practitioners have sought to expose and subvert those representations in order to establish alternative feminist practices. After theoretical discussion which explores the relationship between representation and ideology, the possibility of a women's language and the relationship between gender and genre, the book examines

representation in literature (using examples of the short story, poetry and autobiography) and visual images in painting and in film and television. Pornography is also discussed and the book closes with a consideration of recent developments in feminist drama and comedy.

The *Conclusion* provides a survey of the course and considers the future possibilities for women's studies and feminism.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination U221.

Complementary and related courses U207 is designed to fit into patterns of study which include courses from any faculty, but it has particular relevance to A102, [A203], [A312], A319, D103, [D207], [D233], [D355], E333, ED356, [SD286], T102, [TAD292], [U221], [U203], [U204], U205.

Assessment TMA's 01-08 (50%) and the examination (50%). TMA's 07 and 08 are a compulsory project (50%).

Broadcasts and cassettes Eight television and eleven radio programmes and two audio cassettes.

Residential school A one-week course-based summer school offers an opportunity for extended study of ideas and topics raised in the course.

Set books A. Carter (1986) *Wayward Girls* and *Wicked Women*, Virago. E. Haythorne (1988) *On Earth to Make the Numbers Up*, Yorkshire Arts Circus.

U208

THIRD WORLD DEVELOPMENT

Second level: Full credit

This course has one overriding question: *what can be done about Third World development?* Many people are concerned about the compelling problems arising in the Third World — hunger, poverty, disease, environmental

degradation and over-population. With the end of the Cold War, these are some of the most important problems facing humanity. The World Bank has declared that the halving of Third World poverty by the turn of the century is its top priority. This course explores how that can be done, giving you analytical tools for understanding the variety and complexity of developing countries and ways to think about solutions to the problems faced by poor people in those countries. We hope to give substance to your compassionate concerns and enable you to evaluate your moral positions with the benefit of more sophisticated analytical ideas and a stronger foundation of knowledge about developing countries and development processes. Many of the analytical ideas will also be applicable to the industrialized world.

Our aim is to teach you:

- How to assess answers to the question 'What can be done about Third World development?'
- About the origins of problems such as poverty, famine and disease, and, more generally, the causes of uneven development.
- To evaluate strategies for overcoming poverty, famine and disease in the Third World.
- Concepts for understanding the problems faced by developing and industrializing countries.
- How work in the social sciences, arts, technology and sciences can inform our understanding of Third World development.

The strands of enquiry running through the course include:

- **Development studies** Ideas, many of them from political economy, that illuminate the processes of economic and social development.
- **Gender relations** The analysis of relations between men and women, their implications for the lives of women, children and men, and how they influence and are influenced by processes of development.
- **Culture** Cultural diversity and the role of culture in expressing different understandings of the world.
- **Environment, science and technology** The relationship between social and environmental change, and the place of science and technology in social change.

Content The course is divided into four parts, each with textbook and a study guide.

Part I introduces the problems in developing countries and their historical context, providing you with a basis for understanding the diversity of developing countries, the unevenness of development between countries, regions and social classes, and some of the differences between meanings of development. The text book is called *Third World Development in the 1990s — an Introduction*. There will also be opportunity to study the music and writing of South Africa, the *Third World Atlas* and much more besides.

Part II is about the process of development through industrialization. The text book is called *Industrialization and Development*. It establishes the central role of industrial development in processes of economic growth while examining some of the social and economic costs of industrialization: increasing inequality and growing debt. Through an examination of successful industrialization in Brazil and South Korea, you will also learn about different theoretical approaches to understanding development. You will also learn how industrialization has influenced popular culture.

Part III moves to a second key area of development, food production and people's survival. It looks at the countryside and how to understand rural livelihoods, rural poverty and the processes of accumulation and strategies of survival which determine them. The textbook is *Rural livelihoods: Crises and Responses*. It will teach you to use analytical concepts concerning gender and the household, markets and distribution, environmental influences on production, agricultural transformation and technical change and international trade. You will also study writing by Indian women.

Part IV draws on previous parts to explore what can be done about Third World development. The textbook *Development Policy and Public Action* is an original approach to what actually happens in development policy. It introduces two alternative views of how governments influence economic development.

Then, through case studies of public action and processes of change, it provides an analytical framework with which to understand structural adjustment policies and ways in which the dynamics of public action can be influenced.

The *Third World Development Atlas* presents historical, political and economic data, providing comparative statistics on the development experience of countries throughout the world.

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination Under discussion: possibly U204 *Third World studies*.

Complementary and related courses D103, A102, D102, S102, T102, S238, A319, E200, B789, T274, T247, U205, U206, U207, [U221], DE325, D210, D205, D209, D213, D345, D312, ED356.

Assessment Eight tutor-marked assignments (12.5% each). Substitution can apply to all but the last two, of which one will be an essay based on research carried out at the residential school. Examination (50%).

Broadcasts and cassettes Sixteen TV programmes, four radio programmes and four audio cassettes. The TV programmes allow you to see the circumstances which development has to overcome, and the successes and failures of past public action. The radio programmes are magazine programmes presenting topical interviews and teaching. The audio cassettes link TV to teaching. They include world music, readings of fiction and activities linking TV programmes to the textbooks and study guides.

Residential school The one-week, course-based summer school offers speakers with experience, on the one hand, of national development planning and, on the other, of self-organization by peasants or women's groups. You will have the chance to learn to use a computer model of development planning to examine the economic consequences of development policies, and there is a module on the relationship between environment and culture in the Caribbean, as well as world music, poetry and films from the Third World.

Set books The course reader, H. Johnson and H. Bernstein (eds.) *Third World Lives of Struggle*, Heinemann Education Books (revised edition). There is likely to be at least one other set book.

OVERVIEW

The University has made an increasing contribution in the health and social welfare field since 1973 and the Health and Social Welfare Department is one of its fastest growing areas. The Department is part of the Institute for Health, Welfare and Community Education which was established in September 1988, and now offers courses and free-standing study materials in four broad areas: ageing, disability, health studies and nursing, and children, young people and the family.

The courses are developed from a strong base of multidisciplinary research and academic knowledge and are suitable both for students who have a purely academic interest in the area and for those with professional interests, whether they work in the statutory, voluntary or private sectors.

The Department's academic plan has been designed to provide a series of learning ladders ranging from introductory study packs and short courses, available in the associate programme (see Section 5), to undergraduate courses, diploma programmes, taught master's and research degrees.

Plans for a Diploma in Health and Social Welfare (DipHSW) are now well under way. The development of this diploma reflects the changing needs of those who work or receive services in health and social welfare. The flexibility of open learning is particularly attractive for the many people interested in this area whose circumstances prevent them from obtaining a similar qualification by a more conventional route.

The DipHSW will be awarded to students who successfully complete two credits' worth of study at undergraduate level. One credit is made up from four core compulsory quarter-credit courses, three of which will be available for the first time in November 1992. The remaining credit is made up from one or more optional courses, some of which are currently available in both the undergraduate and associate programmes.

Recommended study route to the diploma

Our recommended study route through the DipHSW will be as follows:

Stage 1: Compulsory core courses (three quarter credits)

K660 *Health and well-being*
K662 *Community care*
K663 *Roles and relationships*

Stage 2: Optional courses (amounting to one credit). New courses will be added to this list as the diploma programme develops. Courses marked* are available now.

Quarter-credit courses

K665 *A disabling society*
K668 *Mental handicap: changing perspectives**
K669 *Death and dying*

Half-credit courses

K254 *Working with children and young people**

B782 *Managing health services**

E241 *Special needs in education** (to be replaced by E242 *Learning for all* in 1992)

D251 *Issues in deafness**

K256 *An ageing society*

B789 *Managing voluntary and non-profit enterprises*

Full-credit courses

D211 *Social problems and social welfare**

U205 *Health and disease**

Stage 3: Compulsory course (one quarter credit)

K670 *Themes and issues*

Until the compulsory core courses become available, you can study one or more of the optional courses; you may already have taken one or more of them as part of your BA degree or as an associate student. When you register for your first core diploma course in 1992, you can then ask for up to one credit to be counted towards the DipHSW. You will be half-way towards obtaining the Diploma in Health and Social Welfare, and eligible for it after completing only one more credit's worth of study. (You can count a course credit towards a maximum of two qualifications).

While the Diploma in Health and Social Welfare is an award in its own right, we also see it as a first step towards awards in other areas of professional development such as social work or nursing. The Open University is consulting widely with colleagues in the nursing, social work and remedial professions and working with employing agencies, colleges and validating bodies to promote a number of 'professional diplomas' in the health and social welfare field.

Further information

If you would like information about the Diploma in Health and Social Welfare, or to be kept informed about developments to do with these professional diplomas, please write to The Information Officer, Department of Health and Social Welfare, The Open University, Walton Hall, Milton Keynes MK7 6AA. You can also ask the Health and Social Welfare Regional Development Officers at your local Regional Centre for advice or information about the diploma programme.

When reading the following course description do not forget to refer back to Sections 1-3 and Tables I, II and III at the beginning of this publication.

K254

WORKING WITH CHILDREN AND YOUNG PEOPLE

Second level: half credit

This course is designed to increase your

understanding of children and young people, of their experiences as they grow up and the difficulties many of them face in a society characterized by conflicting values and an unequal distribution of power and resources. The course is primarily for those actively involved in care work with children and young people, such as residential care staff, social workers and foster-parents, but it is suitable for anyone interested in exploring the important issues and current practice in this field.

K254 is a Part A course in the Advanced Diploma in Special Needs in Education and an optional course in the Diploma in Health and Social Welfare.

Content

Prologue *Orienting ourselves* introduces the main themes of the course: social and personal construction of reality; power and power relationships; internal and external resources; a model for describing and analysing social work and social care practice in relation to children and young people.

Workbook One *Identity and role* Part one examines the importance of identity and theories of identity development. Part two looks at problems that can arise when identity is spoiled by stigmatization, disrupted by role confusion and conflict, or is not satisfactorily achieved. The relationship between identity problems and low self-esteem is explored and implications for work with children and young people are drawn out.

Workbook Two *Growth points* Part one examines the nature and importance of transitions in the process of development and considers the different views of development offered by psychoanalysis, cognitive developmental theory and systems theory before looking at the life-cycle transitions common to all, such as early separation experiences, starting school and leaving home. Part two turns to consideration of life crises, their potential for stress and their effect on individuals. It provides models of coping and intervening in crisis situations and relates these to work with children and young people.

Workbook Three *Social deprivation* Part one begins by exploring the meaning of poverty and what it feels like to be poor in an affluent society like Britain. Different explanations of the existence of poverty are then contrasted. Part two relates poverty to the social and personal problems that bring people into contact with social work agencies and explores the implications for practice in relation to children and young people, using family centre work as an example.

Workbook Four *Children with special needs* starts from the premise that disabled or handicapped children are children first and have the right to as normal a life as possible. Models of disability are discussed and different types of mental and physical impairment are described together with the implications for services and support. The workbook is illustrated with short studies which challenge attitudes and practice in relation to children with special needs and their families.

Workbook Five *Deviance: rule breaking and law breaking* Part one considers theories of deviance and how it is socially constructed and looks at some examples of young people's rule-breaking behaviour. It then considers how adults, particularly those in caring roles, can best respond to the challenges such behaviour presents. Part two looks at juvenile crime and explores the juvenile justice system in some detail, with special consideration given to ways of working with young offenders.

Workbook Six *Prejudice and abuse* Part one examines the prevalence and effects of racism and sexism in our society and considers how social workers and others can help combat these effects and help children and young people develop positive images of themselves. Part two is about child abuse, its definition and competing explanations; and the professional roles of care-workers in recognizing and reporting suspicions or allegations, and in caring for children and young people who have been abused or working with their families.

Workbook Seven *Partnership* explores what is meant by partnership and the extent to which it is possible for adults in general, and social workers in particular, to work in partnership with children and clients. The implications of the 'empowerment' of children are drawn out.

NOTES FOR PROSPECTIVE STUDENTS

Complementary and related courses This course extends the work of D103 (which provides a general social science background to K254). K254 is also complementary to D211 in that it follows up some of the child-care issues raised, and E206 in that it explores in depth related aspects of child development.

Broadcast and cassettes There are no broadcast TV or radio programmes. Instead there are six thirty-minute returnable video cassettes and six hours of audio cassettes. The audio-visual materials work with the course texts to stimulate discussion of practical matters by illustrating skills and methods used in work with children and young people. The video settings include a children's resource centre, a family centre, a special school, an intermediate unit and a child's home.

Assessment (i) TMAs 01.03 (30%); (ii) TMA 04, a project (20%); (iii) the examination (50%). TMA 02 is not used for assessment. Alternative TMAs will be available to meet the needs of students with disabilities or studying in restricted conditions.

Set books There are two set books: S. Morgan and P. Righton (1989) *Child Care: Concerns and Conflicts*, Hodder and Stoughton; B. Kaham (1989) *Child Care, Research Policy and Practice*, Hodder and Stoughton. You will receive with your course units a law handbook setting out the law relating to children and young people, and an 'Aids to Practice' folder describing methods and skills used in social work and social care.

Preparatory work If you have no previous experience of child development work we recommend as preparatory reading K. Sylvia and I. Lunt (1982) *Child Development: a First Course*, Grant McIntyre.

SECTION 4: DESCRIPTIONS OF 1992 UNDERGRADUATE COURSES

This section describes the undergraduate courses which we hope will be available for the first time in 1993. This section should be used only as a guide, as the detailed programme for 1993 has not yet been finally decided. The University reserves the right to withdraw or defer courses and more courses may be added. Similarly, there may be alterations to the details.

From 1992 some course codes will include a double letter, e.g. AA301. The second letter still represents the same faculty; we have to adopt this coding when all a faculty's single-letter alphanumeric combinations have been used.

1992 courses

A206	AD280	M337
A231	D311	M434
A295	DEH313	S267
A316	E326	S280
A420	EH266	T237
A421	M336	T395

A206

ENLIGHTENMENT EUROPE

Second level: full credit

This course introduces twenty or so 'texts' — paintings, poems, buildings, historical documents, novels, buildings, a play, an opera, a medical treatise — produced in Europe during the second half of the eighteenth century. The aim of the course is to promote your enjoyment and understanding of the texts and to lead you to a consideration of the characteristics which tend to unify, or to disrupt, the culture of the period.

The teaching always moves from text to context — from a painting or poem or document to the historical background against which it was produced. To give a couple of examples, a study of the correspondence of two rulers, Catherine the Great of Russia and Frederick the Great of Prussia, opens up the nature of 'Enlightened despotism': a study of writings by the English, Christian Dr Johnson, the Scottish sceptic David Hume and the anti-religious French contributors to the *Encyclopédie* opens the way to a discussion of the extent to which they can all usefully be seen as members of a single 'enlightened' movement.

The texts are grouped into five parts, each introduced and concluded by brief sections which raise questions about the relationships between the texts. But the texts themselves are the heart of the course: week by week, you are guided through them by written commentaries, television programmes and discussions on radio and cassette.

Part A Varieties of enlightenment

The *Encyclopédie*

Frederick the Great and Catherine the Great
Haydn's *The Creation*
Beccaria, Howard and penal reform
Dr Johnson

Part B Reactions to Classical Antiquity

Gibbon's *Decline and Fall of the Roman Empire*
Hume's *Of the Standard of Taste*
Sir Joshua Reynolds and the Royal Academy
The architecture of Robert Adam

Part C Best of all possible worlds?

James Lind's *Treatise of the Scurvy*
Captain Cook and Olaudah Equiano
Voltaire's *Candide*

Part D Religion and humanity

Hume's *Dialogues concerning Natural Religion*
Lessing's *Nathan the Wise*
Mozart's *The Magic Flute*

Part E Nature, feeling and society

The poetry of Pope, Thomson, Swift, Crabbe, Burns
Rousseau's *Emile*
Mary Wollstonecraft's *Vindication of the Rights of Woman*
The *Salon* of 1765
Laclos's *Dangerous Liaisons*

NOTES FOR PROSPECTIVE STUDENTS

Excluded combination A204.

Recommended prerequisite An arts foundation course. *Enlightenment Europe* is designed for all those who, after arts foundation course, wish to continue

with a broadly based historical study of a decisive period in the development of European culture.

Complementary and related courses [A203] and A205 would complement *Enlightenment Europe* in building a solid, interdisciplinary, historically wide-ranging base for any of the Faculty's specialist courses.

Assessment Eight TMAs (50%) and the examination (50%).

Broadcasts and cassettes Sixteen television programmes either expound a text or set it in its social context; radio programmes act as tutorials. Audio cassettes present performances of the Haydn, Mozart and Lessing, readings of the poetry and teaching of the architecture.

Students with disabilities If you have completed the arts foundation course, you should be able to cope with A206.

Set books We hope that you will have to buy only two books: C. Laclos *Les Liaisons dangereuses* (*Dangerous acquaintances*) trans. R. Aldington, Ark Paperbacks, Routledge 1987; Samuel Johnson *The Oxford Authors edition*, ed. D. Greene, Oxford University Press 1984.

A231

RELIGION IN POST-WAR BRITAIN: THE RISE OF A MULTI-CULTURAL SOCIETY

Second level: half credit

The course will examine the role and significance of religion in post-war Britain, looking in particular at the closely interrelated themes of the decline of a specifically 'Christian' society and the emergence of a culturally and religiously pluralist society in Britain during the post-war decades. We will investigate these themes by means of three 'core questions':

- To what extent and in what ways has religion remained a significant influence in British culture and society in the period since 1945?
- To what extent and how is religion important in interpreting and understanding the development of a multi-cultural and multi-ethnic society in post-war Britain?
- To what extent has Britain remained, or ceased to be, a 'religious society' in the period since 1945?

In order to examine and discuss these core questions, the first half of the course will introduce the major (and some of the minor) religious traditions of post-war Britain, and the second half will study controversies within or about religion in post-war Britain. In order to tackle the questions you will be required to familiarize yourself with both primary and secondary sources, including at least one literary characterization of the religious life of the period.

The course material will consist principally of four books: two volumes of essays written by the course team, a reader of primary sources and a novel. There will also be four study guides to help you through the course material, identify core questions and set exercises, and a course guide and a reading guide to the set novel *How Far Can You Go?*

The course should appeal to you if you have an interest in recent religious history, in the social history of post-war Britain or in the role of religious pluralism in the emergence of a multi-cultural society.

NOTES FOR PROSPECTIVE STUDENTS

Recommended prerequisites, complementary and related courses There are no prerequisites but it is desirable that you should have completed A102 or D102.

Assessment Four TMAs (50%) and the examination (50%).

Cassettes Two video cassettes and four audio cassettes supplement the teaching in the study guides. There are no broadcasts.

Tuition There will be local tuition, evening tutorials or day schools.

Students with disabilities This course should present no special problems.

Preparatory reading The best preparation is to read the novel *How Far Can You Go?* by David Lodge. You could also look at *Religion, State and Society in Modern Britain*, ed. P. Badham, The Edwin Mellen Press, 1989 and chapters 4-8 of *The British: Their Religious Beliefs and Practices 1800-1986*, ed. T. Thomas, Routledge, 1988.

Set books You will have to buy the reader of primary sources and the novel *How Far Can You Go?* by David Lodge, Penguin, 1981.

Special features You will need easy access to video and audio cassette players.

A295

HOMER: POETRY AND SOCIETY

Second level: half credit

This course is for students who have interests in literature, ancient social history and archaeology, and especially in how these areas of study relate to each other. The focal point of the course will be the two early Greek epic poems of Homer, the *Iliad* and *Odyssey*, read in a modern verse translation with the aid of line-by-line commentaries. These two poems, composed in about 750 BC out of traditional legend and saga, tell of the Greek siege of the citadel of Troy and its aftermath, the wanderings and homecoming of the hero Odysseus to Ithaca. We begin by looking at these poems as oral compositions — the products of a long improvisatory tradition of story-telling which continues to influence story-telling in our own day. The *Iliad* and *Odyssey* can also be read as social documents, apparently reflecting a 'heroic' age which emphasizes the tensions of a society at war as well the domestic values of peace. What society, if any, these poems reflect in reality will be an important question.

Two features of the course will be study of the archaeological context through an examination of Late Bronze Age sites such as Troy and Mycenae, and consideration of the influence of Homer on successive generations of ancient Greek and modern readers. Indeed, these two aspects are very closely related, since it was through the influence of the poems that the nineteenth-century archaeologist Heinrich Schliemann began to dig at Troy and Mycenae. We shall contrast changing modern attitudes to Homer (including our own attitudes) and how they can affect interpretation.

The course will be organized around four learning guides which will chart a path through the course, give you essential information and offer exercises to test your knowledge of the material covered. In the second half of the course you will have an opportunity, in consultation with your tutor, to select and plan your own TMA topic: learning guide four will help you with this.

Recommended prerequisites A102 and A293 and/or A294.

Complementary and related courses A293, A294.

Assessment Four TMAs (50%) and the examination (50%).

Cassettes One three-hour video cassette and four 1½-hour audio cassettes. There will be no broadcasts.

Student with disabilities Recordings of course material will not be available in the course's first year. There will be alternative questions for assignments that depend on visual source material.

Preparatory reading *The Odyssey of Homer and Homer's Odyssey, A Companion to the English Translation of Richmond Lattimore* (see below).

Set books You will need to buy *The Odyssey of Homer*, trans. R. Lattimore, Harper and Row; *Homer's Odyssey, A Companion to the English Translation of Richmond Lattimore*, Peter Jones, Bristol Classical Press; *The Iliad of Homer*, trans. R. Lattimore, The University of Chicago Press; *A Companion to the Iliad, Based on the Translation by Richmond Lattimore*, Malcolm M. Willcock, The University of Chicago Press. You will receive a book of essays as part of the course material.

Special feature You must have the use of audio and video cassette players.

A316

MODERN ART: PRACTICES AND DEBATES

Third level: full credit

This is a course about how modern art has developed from the mid-nineteenth century to the late 1970s. You need no special historical or practical knowledge of art. The course is designed for students who are interested in understanding why it is that modern art has developed as it has. Over the modern period, the expectations of what an artist does and of the sort of skill he or she possesses have altered radically. Among the questions the course asks are: how has the concept and practice of art changed? Why is it that some works of art have come to be seen as exemplifying a modern tradition? How are judgements of value ascribed to modern works of art? How relevant are questions of gender to the way art is made and what it means? Can abstract art hold meaning in the same way that figurative art does? Not all the art that has been produced over this period has been deemed to be 'modern', and we ask how ideas about 'art' and the 'modern' have developed and have been the subject of debate. We look at the relationship between works of art and the interpretations that have been made of them, and question how what is seen as significant in the art of the past has been, and continues to be, shaped by the concerns of the present. So the course entails not only a study of a wide variety of works of modern art but also of the critical debates surrounding them.

The main aims of the course are to:

- Help you to understand how and why art has developed as it has since the mid-nineteenth century.
- Equip you with skills of critical enquiry you need in order to analyse works of modern art.
- Acquaint you with and encourage a critical understanding of works of art from the modern period and interpretations of modern art.
- Enable you to assess the validity of various interpretations and evaluations in modern art.
- Allow you to gain confidence in talking about works of modern art and thinking about problems of visual representation.
- Encourage a questioning approach to works of art, which over the modern period have been subject to conflicting interpretations.

Content The course will be divided into four volumes of essays with accompanying study guides. The four volumes are chronological: Book One deals with the period from the mid-nineteenth century to 1900, Book Two the period up to 1920, Book Three the inter-war years and Book Four the post-war period up to the 1970s. The essays in each book will approach the historical material with a different set of issues in mind, and the validity of different approaches and methods will be open to discussion. The plan for the books is:

Introduction

Part 1 Modern Practices of Art and Modernity
Part 2 Impressionism, Modernism and Originality
Part 3 Gender and Representation

Book Two (c1900-1920)

Part 1 Primitivism and the 'Modern'
Part 2 Realism and Ideology: from Icon to Sign
Part 3 Abstraction

Book Three (c1920-1940)

Part 1 Common Ground and Contested Space: Paris 1920-30
Part 2 Construction, Rationalization and Modernity
Part 3 Surrealism and Psychoanalysis
Part 4 Realisms and Realities

Book Four (c1940-1970)

Part 1 Late Modernism in Art and Theory
Part 2 Politics in Art
Part 3 Modernity and Modernism Reconsidered

Each essay will be illustrated with colour and black and white illustrations. As you work through the course you will become familiar with a growing range of works of art and engage with a developing body of ideas about them.

United States and
European culture

Third World

A102, D103,

courses The Arts
area of interest in
the history and
the Reformation and
European history and
France (A293,
A324). AD280 would
existing and planned
culty. D205, (D208),
2, D314, D345.

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welfare regimes are identified. These
international trends in welfare are discussed in
detail through the examination of particular
societies.

Block 8 Future agendas, a short concluding
block, identifies future trends in welfare and
economic developments, and includes a review
of the course.

Recommended prerequisites Although there are
no prerequisite courses, it is advisable to complete D102
or D103 first. D211 and DSE202 are also useful
preparation.

Complementary and related courses D102/
D103, D211, D212, (DS262)/DSE202, (D209),
(D207)/D213, D31, D307, DE354.

Assessment Eight TMA equivalents and the
examination. There will be one double TMA attached
to Blocks 3 and 4, and one formative TMA to help with
exam preparation. Substitution can apply to one TMA.

Broadcasts and cassettes Two thirty-minute video
cassettes and eight thirty-minute audio cassette
programmes.

Residential school A course-based 2½ day resi-
dential school is planned, to give you academic support,
an opportunity for learning not possible by other means
and some advice about the double TMA.

Students with disabilities Generally, this course
should present no special problems. There is video
material related to Blocks 6 and 7 and at the residential
school; the course team is making every effort to
provide it on alternative media.

Set books There will be a course reader and one
other set book.

Special features You must have the use of a video
cassette player.

DEH313 PRINCIPLES OF SOCIAL AND EDUCATIONAL RESEARCH

Third level: full credit

This course should equip you to read and
evaluate published research, both quantitative
and qualitative, acquaint you with current
debates about the role of research in creating
theory and policy, and introduce ethical and
political aspects of social research. The five
blocks cover the nature of social research; de-
scription and explanation; research design;
collection and analysis of data; and reporting on
research and evaluating reports. The course
assessment requires evaluation of published re-
search reports on increasingly complex criteria,
and carrying out and reporting on small-scale
exercises in aspects of research.

Excluded combination [DE304].

Recommended prerequisites A social science
foundation course and at least two other credits in
social science, education or the U area.

Assessment Eight TMAs and the examination.

Cassettes Practical examples and some teaching
material will be presented on video, and there will also
be programmes on audio cassettes.

Computing You must have the use of a micro-
computer that meets the specification of the University's
home computing policy (see page 4), for statistical
analysis, teaching programs and (optionally) word-
processing.

Students with disabilities This course should pre-
sent no special difficulties, although if you have impaired
sight you might be at a disadvantage in the computing
activities.

Set books There will be a course reader.

Special features You will need the use of a video
cassette player.

E326 MANAGING EDUCATION IN THE 1990s (provisional title)

Third level: half credit

This course replaces E325 *Managing schools*. It

comprises two closely linked but free-standing
modules which can be studied together as a half-
credit course in the undergraduate and associate
programmes, and as separate modules in the
certificate programme. The two parts take
complementary approaches to study of
educational management. The first, *Managing
educational change*, looks at some theories and
processes of educational management, using
the theme of change and development. The
second, *Managing for school effectiveness*,
concentrates on schools and the main areas of
day-to-day management.

The course is intended for staff who have
management and leadership responsibilities at all
levels in the school, and will also be of value to
parents and governors. It will pay much more
attention to equal opportunities, and in
particular to gender issues, than its predecessors.

Content *Managing educational change* will
look at approaches to and processes of
educational management which are applicable
to all sectors (school and post-school),
particularly in relation to individual, group, and
institutional change and development. You will
be asked to reflect critically on your own
assumptions in the light of the concepts
presented in the module. You will be able to
develop new insights by comparing the
approaches different sectors take to common
themes such as planning and institutional
change.

Managing for school effectiveness will examine
the relationship between management struc-
tures, processes and cultures and the effective-
ness of schools. It will examine effectiveness in
terms of school culture and ethos, some
important areas — teaching and learning,
resources, staffing, environmental links,
marketing — and how they are linked in
developmental planning for individuals,
departments and the school as a whole.

Excluded combination E325.

Assessment Four TMAs and the examination.

Broadcasts and cassettes Eight TV programmes
(also available on video cassette) and two audio
cassettes.

EH266 LEARNING THROUGH LIFE: EDUCATION AND TRAINING BEYOND SCHOOL

Second level: half credit

This course will be available to both
undergraduate and associate students. There
are no recommended prerequisites. Some of
the assignments (likely to include a project of
your own design) will enable you, if you are a
practitioner in the field, to make use of work
experience, but experience is not required and
the course will be accessible to anyone. Your
own approach to learning will be given priority in
the course materials and study time. There will
be activities, supported by cassette and television
interviews, designed to increase awareness of
learning styles and behaviours, how these differ,
and whether learners can take action to improve
the effectiveness with which they learn.

The course will develop your understanding
of the experience of learners over the age of 16,
and of the social processes which shape that
learning in different contexts. Some of the main
developments in this area will be analysed as
case studies: the Training and Enterprise
Councils, National Vocational Qualifications,
Adult Basic Education, Open Learning Centres,
credit transfer, access courses, women returning
to learning, community schools and selected
examples of provision in further education
colleges and higher education. There will be
comparison between the UK, the EC and other
European approaches in this field, reflecting the
enormous changes under way in Europe which
will influence UK provision during the 1990s.

For those who wish to continue their studies in
these areas, EH266 is one of the prerequisite
courses in the Diploma in Post-compulsory
Education (see page 30) which also counts for
one full credit in the MA in Education.

M336 GROUPS AND GEOMETRY

Third level: half credit

This course will build on the group theory and
geometry, and to some extent the linear algebra,
of M203. Its main aim will be to help you to
integrate your geometric thinking by developing
a unified approach to geometric and algebraic
entities. This approach is based on classification
schemes, using algorithms where appropriate.

The geometric entities studied in the course
are regularly patterned structures and figures
such as tilings, pavings, friezes and wallpaper
patterns (in two dimensions), and crystals and
regular solids (in three dimensions). The
algebraic entities are groups — both the
symmetry groups of geometric figures and the
more abstractly defined finite abelian groups.

The course will have an introductory block of
four units, to revise the necessary material from
M203 and introduce the structures which will be
the main objects of study. Then the course will
divide into two streams: Abelian Groups and
Geometry. There will be three blocks after the
introductory block, each comprising two units
from each stream.

Recommended prerequisite M203.

Related courses M203, [M386].

Assessment Four TMAs (50%) and the examination
(50%).

Cassettes There will be three hours of audio cassette
and three hours of video cassette material, so you must
have the use of audio and video cassette players.

Students with disabilities The many diagrams may
present difficulties if you have severely impaired sight.
We are trying to find ways to help with this problem.

M337 COMPLEX ANALYSIS

Third level: half credit

This course will give an elementary introduction
to the classical theory of analytic functions of a
complex variable. Analytic functions have many
applications both within mathematics and also to
the physical sciences and technology. More
recently, they have been used extensively in the
generation of 'computer art' associated with
fractals.

Excluded combination M332.

Recommended prerequisites A good pass in either
M203 or MST204, or a comparable background in
advanced calculus.

Assessment Four TMAs (50%) and the examination
(50%). Substitution can apply to one TMA.

Cassettes Four ninety-minute audio cassettes and
one returnable video cassette.

M434 DIFFERENTIAL GEOMETRY

Fourth level: half credit

This course is for students who are familiar with
algebra and differential calculus. It develops the
interactions between linear algebra and
differential calculus in order to study the main
ideas and examples of classical differential
geometry, using modern mathematical
techniques where they simplify or clarify the
exposition. All the curves and surfaces studied
will be in three-dimensional Euclidean space and
so will be readily visualized and capable of
explicit description in terms of standard
functions. The course is based on the set books.

Recommended prerequisites M203 and MST204.
You are advised to have obtained at least a grade 3
pass in both these courses (or their predecessors
[M231] and [M201]), or have a comparable
background in advanced calculus and linear algebra
from some other source, before taking M434.

Assessment Four TMAs (50%) and closed-book ex-
amination (50%). Substitution can apply to one TMA.

Students with disabilities This course is not
recommended if you have impaired sight. Those with
impaired manual dexterity and mobility problems will
experience some difficulty.

Set books O'Neill, B. *Elementary Differential
Geometry*, Academic Press. Preparatory reading is not
essential, but the first chapter of this book gives a good
introduction if you wish to acquaint yourself in advance
with some of the main elements of the course.

S267 HOW THE EARTH WORKS: THE EARTH'S INTERIOR

Second level: half credit

The general aim of the course is to introduce the
structure and composition of the Earth's interior,
the geophysical and geochemical processes
occurring there, and how these processes govern
the large-scale phenomena taking place at the
Earth's surface (plate tectonics, growth of
continents, etc.). In short, the course is about the
Earth as an engine. It will be presented in five
sections.

Section 1 *The physical and chemical properties
of the Earth* will give a general introduction to
deep-Earth studies and then discuss the origin of
the Earth as part of the solar system and the
universe, the internal structure of the Earth as
deduced by seismic and gravity methods, and
the physical and chemical characteristics of the
Earth's interior.

Section 2 *Lithospheric structure and tec-
tonics* will deal with large-scale near-surface
processes such as plate tectonics, seismicity,
faulting and deformation, and will explain how
these phenomena are produced by processes
occurring in the Earth's interior.

Section 3 *Crust-mantle interactions* will be
about the geochemical aspects of the Earth's
interior and the effects they produce at the
Earth's surface.

Section 4 *Evolution of the continental crust* will
be a continuation of Section 3, explaining in
particular how the continental crust formed as
the result of interior and near-surface processes.

Section 5 *Planetary evolution* will look at the
dynamic Earth by considering certain aspects of
how the planet evolved to its present state and
comparing these with the state and evolution of
other bodies in the solar system.

The course will be similar in many ways to its
predecessor S237 *The Earth: structure,
composition and evolution* but it will concentrate
more on the Earth's interior and its relationship
to large-scale surface processes.

Excluded combinations [S237]; credits that include
both the sixth-credit courses [S2-2] and [S2-4].

Recommended prerequisites Ideally you should
have successfully completed the science foundation
course (S102, [S101] or [S100]) or at least be
thoroughly familiar with the Earth science units of that
course. You should also be familiar with simple
mathematical equations and drawing graphs.

Complementary and related courses S267 is one
of two second-level core Earth science courses. The
complementary course, S236 *Geology*, largely covers
the geology that can be seen at the Earth's surface. Some
of the content of S267 (or [S237]) is an essential
prerequisite if you wish to go on to study S339
Understanding the continents.

Assessment Four TMAs (35%), four CMAs (15%)
and the examination (50%). Substitution can apply to
one TMA and one CMA.

Cassettes There will be audio and video cassettes.

Home kit There will be a home experiment kit.

Students with disabilities If you have impaired
manual dexterity you may find some of the work with
the home kit demanding.

S280 SCIENCE MATTERS

Second level: half credit

S280 is for all those who have an interest in the
implications and applications of modern science.

It is concerned with well-publicized topics that will influence the future, such as climate change, nuclear power and genetic engineering, and it examines the nature and strength of the scientific facts and opinions that underlie them. This interdisciplinary course is a natural extension of S102 *A science foundation course*; it will enable you to apply the theoretical content of the foundation course to broader scientific problems of public concern.

Content The course is divided into seven books, each concentrating on important aspects of scientific understanding while also looking at social, political and ethical implications. Each book will help you develop and apply scientific skills such as weighing up conflicting evidence, careful observation and deduction.

Book 1 introduces the aim and philosophy of the course and talks about the methods and limits of science. We show how science impinges on broader social issues by considering a case study on motor vehicle exhaust emissions, with special emphasis on lead in petrol.

Book 2 presents the main issues in the nuclear power debate. It examines the operation of nuclear power stations, the controversial problems of nuclear waste disposal, the effects of radiation and the incidence and effects of nuclear accidents.

Book 3 looks at examples of how scientific developments have improved agricultural productivity and at some of the consequences. It also examines some of the underlying science that bears upon food processing and food safety.

Book 4 Techniques are now available to manipulate the genetic material of animals and plants. What opportunities and threats does such genetic engineering present? We consider implications in medicine and in animal and plant breeding.

Book 5 asks how exploitation of the environment threatens the health and survival of species. Can rational conservation policies, based on scientific principles, be used to good effect?

Book 6 is about the central question of global warming and climate change. Why is there so much controversy and uncertainty about future climate change, in spite of the wealth of available data? Can we turn to science for an answer?

A last book brings together some of the themes of the course and looks at current scientific study of the polar regions and at the opportunities and risks inherent in exploitation of these environments.

Recommended prerequisite Ideally, you should have successfully completed the science foundation course, S102, or already have some basic scientific knowledge.

Complementary courses U206, T102.

Assessment Four TMAs (50%) and the examination (50%).

Broadcasts and cassettes Four TV and two radio broadcasts; three one-hour audio cassettes.

T237 ENVIRONMENTAL CONTROL AND PUBLIC HEALTH

Second level: half credit

This new course is a revised version of T234; it is very similar but brought fully up to date. It gives you a basic understanding of our natural resources (land, air and water) and of related environmental problems, and will enable you to:

- Explain the necessity for conservation of land, air and water resources and for keeping pollution to a minimum.
- Quantify and assess the nature and extent of pollution, its dangers and its effects on the physical environment.
- Describe and discuss methods of pollution identification, assessment, measurement and control available in the fields of land, air, water and noise pollution.
- Read, interpret and criticize published data, and perform relevant calculations in the fields of epidemiology, water supply, conservation, and environmental management.

T237 will be complementary to many areas of study in science and technology, such as engineering, environmental and urban management, resource planning, natural resources and environmental health. It lays the foundation for career development and keeping up to date in many environmental areas.

Content There will be some introductory units on epidemiology, chemistry, biology and the natural state of the environment. Most of the course will be concerned with air, water, noise and solid waste pollution, and within each subject the relevant legislation and control and management will also be discussed.

Excluded combinations [PT272] and T234, both of which it replaces.

Recommended prerequisites T102 or S102.

Complementary and related courses Generally, Science Faculty Earth science courses such as S238; also selected biology courses. Technology Faculty: design/systems courses such as T274, T362. Social Science Faculty: planning, human geography and socio-economic courses such as D205 and D310; U206.

Assessment TMAs and CMAs (50%) and the examination (50%). Some TMA work will be based on work with the home kit and substitution will not be allowed for this.

Broadcasts and cassettes Eight TV programmes will reinforce the teaching material, and a video will help with the home experiments. Audio cassettes will include material on legislation, help with home experiments and revision.

Home kit The apparatus provided will allow you to perform pollution assessment experiments.

Students with disabilities If you have impaired sight or hearing you are likely to have difficulty with the experiments. If you have impaired manual dexterity you are strongly advised to seek specialist advice before registering for the course; it will be necessary to use glassware such as a burette for titration.

Set books There will probably be one set book.

Special feature A calculator would be useful.

T395 MECHATRONICS: DESIGNING INTELLIGENT MACHINES

Third level: half credit

This course will help you to acquire the integrate interdisciplinary mechatronics knowledge, and develop skills you will need in order to participate in the specification and conceptual design of intelligent machines. By the end of the course you should be able to:

- Search for, recognize and use appropriate sources of information about mechatronic products, communicate with mechatronics specialists and continue developing mechatronics knowledge and skills acquired during the course.
- Identify opportunities for using or developing intelligent machines and specify simple mechatronic subsystems and systems, taking into account market requirements, environmental, social and human considerations and technological and manufacturing feasibility.
- Devise criteria for selecting mechatronic subsystems and elements to meet a given system specification, and select appropriate mechatronics elements — materials, sensors, actuators, power supplies, power transmissions and controllers — to match a given set of criteria.
- Construct models and prototypes of mechatronic subsystems and systems using simple diagramming, mathematical, computational and experimental techniques.
- Apply appropriate elementary mechatronics design methods and computer-aided design tools to a given mechatronics project.

The course concentrates on the structure, desired behaviour and performance of intelligent machines rather than on technological details. Although some engineering principles will be reviewed, you are expected to be familiar with engineering fundamentals. The emphasis will be on principles and methods applicable to configuring mechatronic systems and subsystems.

Content

Block 1 *Mechatronic fundamentals* explains fundamentals of the subject, which draws on almost all technological disciplines: design; mechanics, materials, electronics, system architecture, information processing and applied artificial intelligence (AI).

Block 2 *Designing perception* is about sensing and communication subsystems for intelligent machines. It includes perception subsystems in mechatronic products such as cameras, printers, machine tools, inspection rigs and automatically guided vehicles; selection of sensors; principles and performance characteristics of infrared, ultrasonic and radar communication systems for mechatronic products; embedded data communication systems; simple vision systems.

Block 3 *Designing execution*, is about locomotion, manipulation and actuation subsystems for intelligent machines. It covers actuators, grippers and high-speed mechanisms for mechatronic systems such as printers, robots and construction machines; elementary geometry, kinematics and dynamics; the balance between mechanical and electronic components; simple control systems; feedback.

Block 4 *Designing cognition* deals with AI subsystems and covers cognitive skills in intelligent machines, such as learning from experience, self-diagnosis, pattern recognition, self-repair; knowledge representation and inference; logic, production rules, frames and semantic networks, search algorithms; simple knowledge systems, architecture; simple neural networks and their use for learning and classifying; vision; decision-making.

Block 5 *Designing mechatronic systems* concludes with integrated intelligent machines: market requirements and design specifications; feasibility; prototyping; mechatronic system architectures; balancing different configurations and technologies; performance, manufacture, testing, packaging; simultaneous engineering; socio-technical design; human-centred design; aesthetic and ergonomic considerations.

Recommended prerequisites T202, T235, TM282.

Complementary and related courses

Assessment Four TMAs and four CMAs (50%) and the examination. One TMA will be a project.

Cassettes Five video cassettes will be an essential part of the course; you must have the use of a video cassette player.

Home kit There will be a home experiment kit associated with the project.

Computing You will need access to a non-standard microcomputer as for T363 (see page 58).

Students with disabilities If you cannot follow material presented on screen, including computer graphics, you will miss essential parts of the course.

SECTION 5: OTHER OPEN UNIVERSITY STUDY PROGRAMMES

ASSOCIATE PROGRAMME

As well as undergraduate courses, the University offers a wide variety of study opportunities for people who do not want to commit themselves to a degree. In the associate programme you can choose a single course or study pack. Some students work at postgraduate level for a diploma that will bring their professional or technical skills up to date while others spend a few hours each week on a study pack, developing their interest in a particular subject. In the Faculty of Social Sciences, for instance, while some students are preparing for the Advanced Diploma in Criminology (Prison Studies) or the Professional Diploma in Social Work with Deaf People, others are studying for professional recognition in psychology and yet others are completing a study pack in women's studies.

The amount of previous experience or depth of knowledge you need will vary. Some courses require a substantial background in the subject while others can be tackled even if you have no previous knowledge.

Courses and study packs to further your career

More than 150 of the BA degree courses described earlier can also be studied in the associate programme as single courses without any further commitment. You receive the same study material as undergraduate students, attend the same tutorials and residential schools, share the same tutors and are assessed in the same way. It is possible if you take these courses as an 'associate student' to transfer any credits you gain to the undergraduate programme once you have successfully completed a foundation course. (For those courses available to associate students in 1992 see Table I. You should note, however, that because of the different funding arrangements for courses in the associate programme these courses have a higher fee than they have in the undergraduate programme.)

As well as the courses shared with the undergraduate programme, which take nine months, there is a rapidly growing range of short associate courses. Many of them are designed to help professionals develop and broaden their skills. They cover areas as diverse as computing, engineering, management, education, health and social services. The courses last from four to eight months. Some students choose to follow a group of related courses to obtain an academic qualification.

Study packs have been developed in similar subject areas for people who prefer to study at their own pace and who do not wish to obtain a qualification. Some packs include optional assessment which allows you to have your understanding of the material assessed. Many short courses and packs can be adapted to suit the requirements of in-house and in-service training programmes.

Courses and study packs to develop personal interests

Single BA degree courses fit into this category. As well as these there are many study packs covering areas such as literature, poetry, music, religion, local and natural history and science.

Family and community packs and courses

These study packs deal with practical problems

that arise when people find themselves needing help with new stages in their lives (having and bringing up children, approaching retirement, looking after elderly relatives or mentally handicapped people, coping with unemployment), or with changes in their environment (increasing concern about health). Some of the packs have optional assessment.

Health and social welfare

This area comprises courses and packs for individual study. Some of the packs include optional assessment and some are linked to additional resources for leaders and tutors organizing group work.

The material is designed for professionals, voluntary carers and consumers and their families. The courses are in four general areas: ageing; children, young people and the family; disability; nursing and health studies. A new Diploma in Health and Social Welfare will be introduced in 1992. More information is available from the Information Officer, Department of Health and Social Welfare, The Open University, Walton Hall, Milton Keynes MK7 6AA.

Professional development in education

There are professional development in education (PDE) courses and study packs for teachers and other professionals involved in or entering education. The programme includes both courses for which you register and receive tuition, and study packs which are self-contained learning materials. Courses can be taken singly, though many can also be counted towards a certificate, diploma or higher degree. More information can be obtained from the Central Enquiry Service (see panel).

The certificate programme

1991 sees the introduction of a new programme of study for teachers in schools and colleges, the Certificate of Professional Development in Education. It takes account of the many recent changes in the curriculum, in school organization, and in the nature of INSET, and will enable teachers to gain credit for their own school-based work at a pace which allows for the demanding nature of their job.

The programme comprises a selection of short courses that count towards the certificate, each lasting one or two school terms and taking either 55 or 110 hours of study. The certificate will be awarded after 220 hours of satisfactorily completed study. There are no examinations; courses will be assessed through assignments only. Some combinations of courses will give you exemption from part of the programmes of study leading to the Advanced Diplomas in Education (see below).

The programme will include courses relevant to primary, middle and secondary schools. Early courses will include *Teachers into business and industry*, *Assessment and the primary curriculum* and *Mathematics in the primary curriculum*, and courses on science, language, design and technology and cross-curricular planning are being developed. Others will deal with the secondary curriculum and with curricular and other matters relevant to teachers of all age ranges. One course, *Professional development in action*, will be based on a project you choose yourself in accordance with your own professional needs.

Ask the Central Enquiry Service for more details about the programme (see panel).

Advanced diplomas in education

The School of Education offers four advanced diplomas in education and one professional diploma in post-compulsory education. Registration for all these diplomas is in the associate programme only.

An advanced diploma is gained by successfully completing one credit's worth of undergraduate courses from a prescribed list followed by a further full-credit applied studies course. The structure of these advanced diplomas is explained in the overview to the School of Education courses and the diagram on page 30.

The diplomas are:

- Advanced Diploma in Educational Management (D02)
- Advanced Diploma in Mathematics Education (D04)
- Advanced Diploma in Special Needs in Education (D06)
- Advanced Diploma in Technology in Schools (D07)
- Professional Diploma in Post-compulsory Education (D05)

Full details of all these diplomas are available from the Central Enquiry Service (see panel). A Part B credit from any of these diplomas gives you exemption from one module of the MA in Education (see below)

Other courses in the School of Education

EP228 Frameworks for teaching

You can study this course only as an associate student, but you can transfer the credit for it to count towards your BA degree. It provides an understanding of teaching in secondary schools and is primarily designed for those just starting their teacher training. It is equally useful during the induction year and is also of interest to those considering teaching as a career, as long as they have access to a school, and to teachers returning to the classroom after a break and experienced teachers who wish to bring their teaching up to date.

The course does not count towards status as a qualified teacher, unless taken as part of a part-time PGCE course in a teacher-training institution. More information can be obtained from the Central Enquiry Service (see panel). See also the School of Education overview.

Management

The Open Business School offers a career-long development programme for practising managers, progressing from the Professional Certificate in Management to the Professional Diploma in Management and on to the MBA. All the courses except some MBA modules can be studied singly. Two study packs are also offered. More details about management courses can be obtained from the Central Enquiry Service (see panel). There is more information about the MBA under Higher Degree Programme below.

Commerce and industry

As well as the courses from the undergraduate programme, courses and free-standing learning packages are available in the following areas:

- Computing: industry and commercial applications of computers, data analysis, COBOL, UCSD Pascal, systems analysis, software engineering, software project management, intelligence/knowledge systems, methods of software development.
- Manufacturing.

- Conservation for land managers.
 - Electronics: microelectronics for industry, digital electronics, telecommunications.
- These courses and packs use a multi-media approach to learning with combinations of printed material and audio and video recordings, and some have experiment kits.

Courses in the Computing for Commerce and Industry and Manufacturing: Management and Technology programmes can be counted towards postgraduate diplomas. With the inclusion of projects and dissertations these may lead to the award of Master of Science degrees. Brochures describing these programmes can be obtained from the Central Enquiry Service (see panel).

For more information about applications to the associate programme, see panel.

HIGHER DEGREE PROGRAMME

Higher degrees by research

The University offers a wide variety of research topics and awards three degrees by research and the submission of a thesis: Bachelor of Philosophy, Master of Philosophy and Doctor of Philosophy.

Applicants must normally have at least an upper second-class honours degree in a relevant field of study, and may apply for full-time or part-time study. Full-time research studentships are tenable from 1 October and are usually based at Milton Keynes or the Oxford Research Unit. Part-time research degrees are studied over a period of four years for BPhil; six years for MPhil and eight years for PhD. (These are maximum periods; it is possible to study each of these degrees over a shorter period.) For part-time degrees applications can be submitted at any time.

Taught master's degree

The University offers a programme of taught master's degrees for part-time study, of which the following are currently available:

Master of Arts in Education

A modular degree of three courses taken over three to six years. Apply in April/May to begin the following February.

Master of Business Administration

A modular MBA taken over two to six years. Apply in April/September to begin the following February.

Master of Arts in Literature

A two-year degree with course-work and dissertation (available in odd-numbered years only). Apply in April/May to begin the following February.

Master of Science in Mathematics

A modular degree of six courses taken over two to six years. Apply in April/May to begin the following February.

Master of Science in Computing for Commerce and Industry

Master of Science in Manufacturing: Management and Technology
Students who complete the University's postgraduate diplomas in these two subjects can apply to take these MScs.

Applications and enquiries about the higher degree programme should be made to the Central Enquiry Service, see panel.

REGIONAL CENTRES

PROSPECTIVE APPLICANTS TO THE OPEN UNIVERSITY

Brochures about other programmes of study can be obtained from the Central Enquiry Service or your Regional Enquiry Service (addresses below). These give fuller information, advice to applicants and details about application periods.

Write to:
The Central Enquiry Service
The Open University, PO Box 71,
Milton Keynes, MK7 6AG
stating which programmes of study you are interested in.

Sale of undergraduate course material

For general availability of correspondence material for the undergraduate courses described in this publication, please write to:
Open University
Educational Enterprises Ltd.,
12 Cofferdge Close,
Stony Stratford,
Milton Keynes MK11 1BY.

Region 01 London

The Open University
London Region
Parsifal College
527 Finchley Road
London NW3 7BG
Tel. 071 794 0575

Region 02 South

The Open University
South Region
Foxcombe Hall
Boars Hill
Oxford OX1 5HR
Tel. 0865 327000

Sub-centre

Winchester
Tel. 0962 867969

Region 03 South West

The Open University
South West Region
41 Broad Street
Bristol BS1 2EP
Tel. 0272 299641

Sub-centre

Plymouth
Tel. 0752 228321

Region 04 West Midlands

The Open University
West Midlands Region
St James House
66-68 High Street
Harborne
Birmingham B17 9NB
Tel. 021 426 1661

Region 05 East Midlands

The Open University
East Midlands Region
The Octagon
143 Derby Road
Nottingham NG7 1PH
Tel. 0602 473072

Region 06 East Anglia

The Open University
East Anglia Region
Cintra House
12 Hills Road
Cambridge CB2 1PF
Tel. 0223 64721

Region 07 Yorkshire

The Open University
Yorkshire Region
Fairfax House
Merrion Street
Leeds LS2 8JU
Tel. 0532 444431

Region 08 North West

The Open University
North West Region
Chorlton House
70 Manchester Road
Chorlton-cum-Hardy
Manchester M21 1PQ
Tel. 061 861 9823

Region 09 North

The Open University
North Region
Eldon House
Regent Centre
Gosforth
Newcastle-upon-Tyne NE3 3PW
Tel. 091 284 1611

Region 10 Wales

The Open University in Wales
24 Cathedral Road
Cardiff CF1 9SA
Tel. 0222 397911

Region 11 Scotland

The Open University in Scotland
60 Melville Street
Edinburgh EH3 7HF
Tel. 031 226 3851

Sub-centre

Glasgow
Tel. 041 332 4364

Regional 12 Northern Ireland

The Open University in Northern Ireland
40 University Road
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